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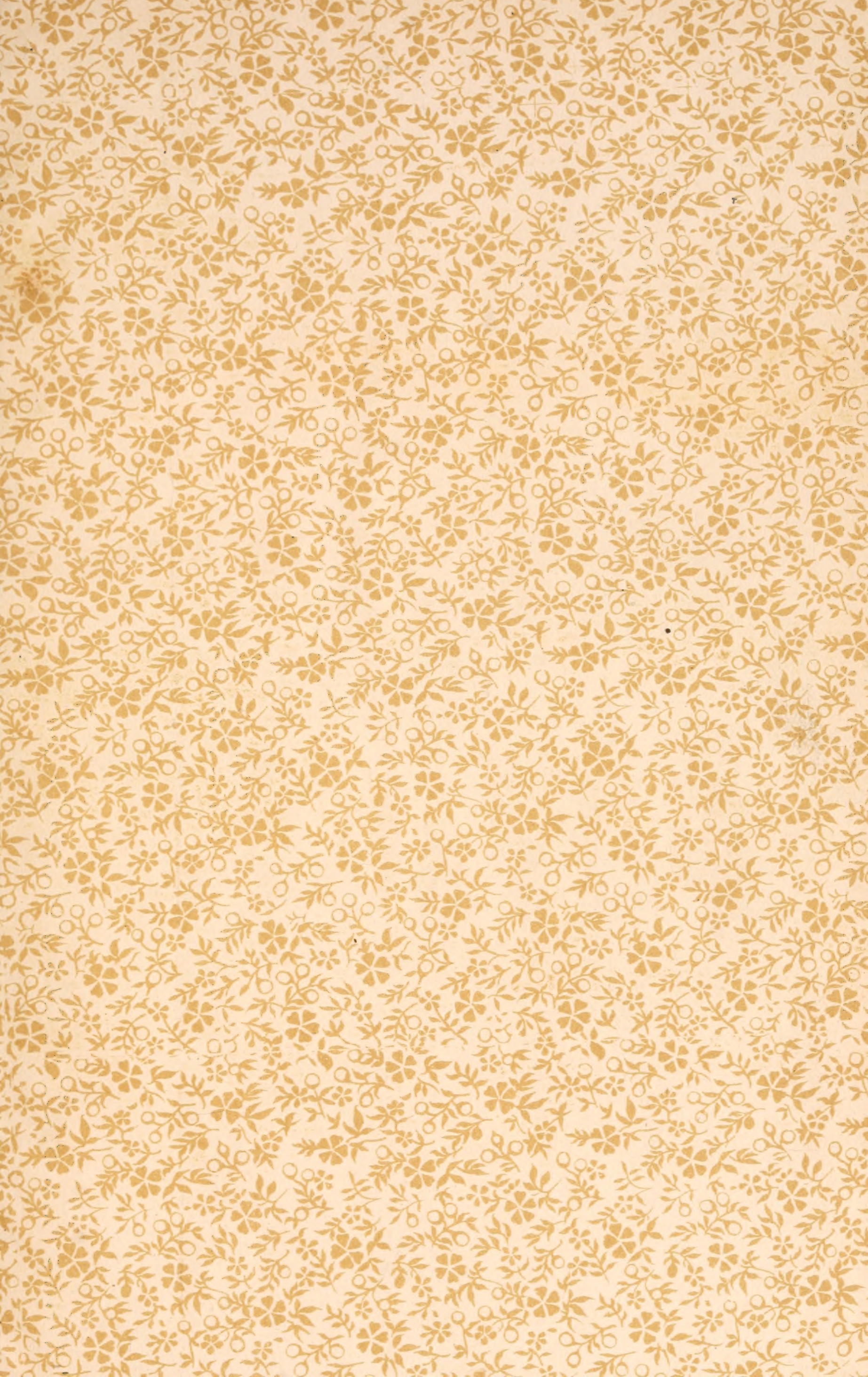

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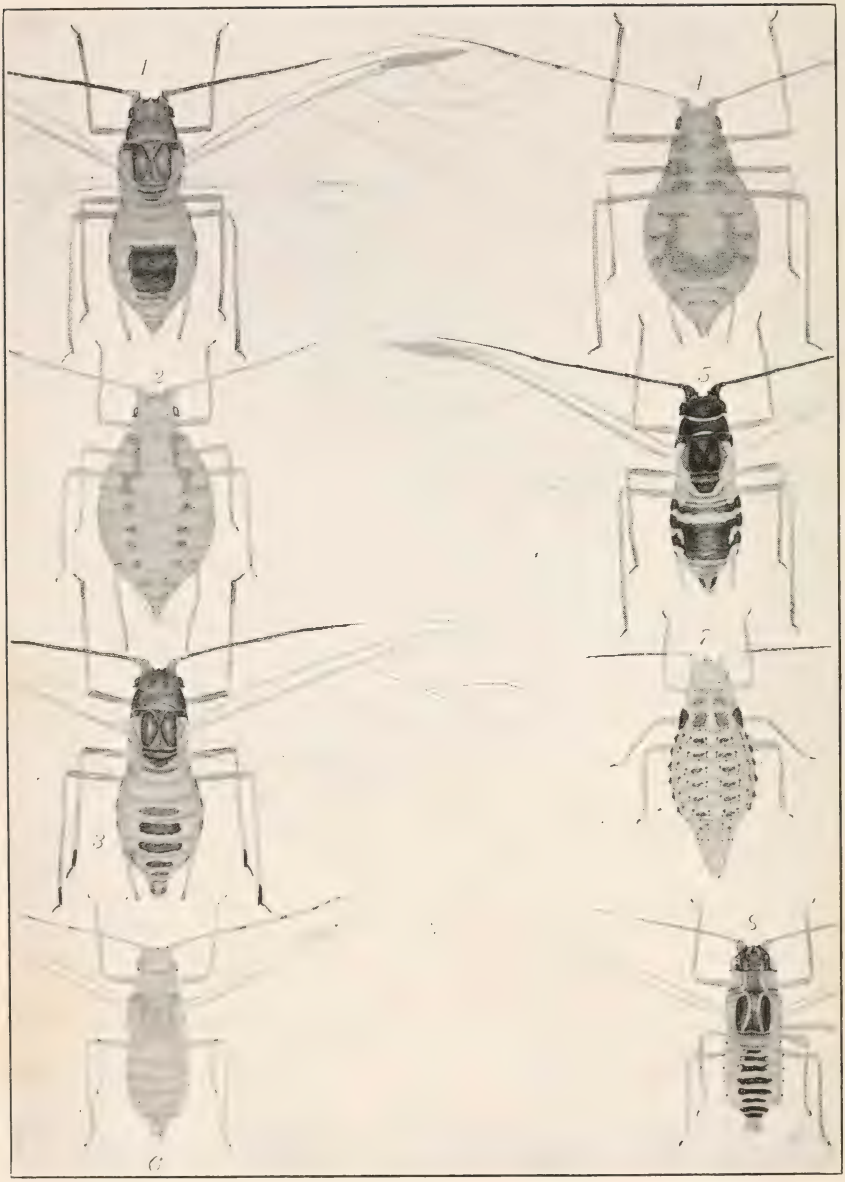

NEW SPECIES OF COLORADO APHIDIDAE.

The Canadian Entomologist.

VOL. XL. LONDON, JANUARY, 1908. No. 1.

BRITISH COLUMBIA SYRPHIDÆ, NEW SPECIES AND ADDITIONS TO THE LIST.

BY RAYMOND C. OSBURN, COLUMBIA UNIVERSITY, NEW YORK.

In a former paper (CAN. ENT., Vol. XXXVI, Aug.–Sept., 1904) the writer recorded seventy-eight species in this family of Diptera for British Columbia, and suggested that a complete list would probably include twice that number. Undoubtedly that estimate was far too small, if the number of species which have been added in three years by a little sporadic collecting is any criterion. With the present additions the list is swelled to more than one hundred and twenty-five. With the exception of ten species of my own collecting not recorded in my former paper on account of uncertainty of determination, and nine species added by Messrs. Currie and Dyar, of the U. S. National Museum, the material for this additional list has been taken by local entomologists. Especial reference must be made to the excellent work of Prof. R. V. Harvey, of Queen's School, Vancouver, to whose careful collecting twenty-two of the additions are due. The remainder were taken by Messrs J. W. Cockle, of Kaslo; R. S. Sherman, of Vancouver, and A. W. Hanham. In 1906 Messrs. Harvey and Sherman made a tour through the Hope Mts. and along the Nicolum River, securing a fine lot of specimens. In 1903 Messrs. H. G. Dyar, R. P. Currie and A. N. Caudell, of the U. S. National Museum, collected in the Kootenay country, and incidentally took forty-one species of Syrphidæ and added nine species to the B. C. list. Mr. D. W. Coquillett has identified this collection, and very kindly turned over the results to me for publication in the following list. The species resting entirely on his identification are so accredited in the list. My thanks are due to Mr. Coquillett for permission to study carefully the collection of Syrphidæ, containing many of the type specimens, in the National Museum.

1. *Microdon tristis*, Loew.

The form *tristis* taken at Kaslo, June 5, 1906, by R. P. Currie, and again by J. W. Cockle on June 5, 1906. The form *cothurnatus* was recorded in our previous list.

2. *Microdon viridis*, Townsend.

Ainsworth, July 11, 1903, by R. P. Currie, and Vancouver, June 11, 1904, by R. V. Harvey.

3. *Microdon marmoratus*, Bigot.

A single specimen taken at Vernon, Aug. 14, 1904, by R. V. Harvey.

4. *Chrysotoxum ypsilon*, Williston.

Kaslo, June 5, 1903, by H. G. Dyar. (Identification by Coquillett.)

5. *Pipiza pisticoides*, Williston.

Taken at Kaslo by Mr. Currie on various occasions ranging from June 12 to July 20, and by Mr. Cockle, June 30, 1906.

6. *Pipiza nigripilosa*, Williston.

A single male specimen taken at Vancouver, June 21, 1904, by Harvey, differs from eastern specimens in having the eyes dark pilose instead of light pilose, but otherwise the agreement is very close.

7. *Pipiza quadrimaculata*, Panzer.

Five specimens taken at Vancouver, July 2, 1906, by R. V. Harvey and R. S. Sherman. This European species has not been recorded from North America until very recently. In "Psyche" for August, 1907, Mr. C. W. Johnson notes its capture at North Mountain, Penn., and Mt. Greylock, Mass. The species thus evidently furnishes another example of circumpolar distribution to be added to the already long list among the Syrphidæ. It is easily distinguished from other American species of the genus by the two interrupted yellow cross-bands on the abdomen, forming the four spots which suggest the specific name.

8. *Chilosia chalybescens*, Williston.

Grouse Mt., July 1, 1904, one specimen by R. V. Harvey.

9. *Chilosia occidentalis*, Williston.

Two specimens by R V. Harvey, one from the Hope Mts., July 24, 1906, the other at Vancouver, June 22, 1906.

10. *Chilosia hoodiana*, Bigot.

One female specimen from Similkameen, July 20, 1906, by R. V. Harvey, I place here, though it shows some differences. The yellow of the knees ("geniculis tibiarumque basi, fulvis," Bigot) is almost wanting, and the fourth abdominal segment is entirely shining.

11. *Chilosia alaskensis*, Hunter.*

Port Renfrew, July 3, 1901, and Glacier, July 20, 1901, R. C. Osburn; Vancouver, May 6, 1905, R. V. Harvey, and June 5, 1906, R. S. Sherman.

12. *Chilosia pallipes*, Loew.

Four specimens, all females, have the characters given by Loew for the species, "humeri lutei, scutellum luteum" (Cent. Quarta, No. 70). Glacier, Aug. 20, 1902, R. C. Osburn; Goldstream, July 19, 1904; and Similkameen, July 20, 1906, R. V. Harvey.

I must admit that I am not able to separate from this species by any definite characters a much larger number of specimens, of which a majority, and notably all the males, fall unquestionably into *C. tristis*, Loew. Williston at one time placed *tristis* as a synonym of *pallipes* (Syn. N. A. Syrphidæ, p. 41), but later retracted his statement (*ibid*, appendix, p. 293). I am strongly inclined to the opinion that he was right in the first place, as the humeral and scutellar lutescent markings are extremely variable in extent in my specimens, and in some cases are entirely wanting. The legs also vary in the amount of yellow, and the shape of the first posterior cell may show variation even between the two wings of the same specimen. It is a very significant fact also that the male of *pallipes* has never been described. Pending more complete study of this question, however, I enumerate the following under *tristis*:

13. *Chilosia tristis*, Loew.

Seventeen specimens in all taken as follows: Port Renfrew, July 6, 1901, and Field, July 19, 1901, R. C. Osburn; Goldstream, July 19, 1904; Vancouver, Sept. 24, 1904, and Similkameen, July 20, 1906, R. V. Harvey. Taken also at Kaslo, June 10 and July 2, 1903, R. P. Currie. (Banff, Alberta, July 17, 1901, R. C. Osburn.)

14. *Chilosia nigripennis*, Williston.

Port Renfrew, June 29, 1901, R. C. Osburn, and Vancouver, May 27, 1905, R. V. Harvey.

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*It is worthy of note that this species has recently been shown to be the cause of the timber blemish known as "Black Check" in the Western Hemlock. The young larva enters an opening made in the bark by a tiny bark beetle (*Hylesinus* sp.), and develops beneath the bark, forming an unsightly scar. Another species, *C. hoodiana*, attacks the White or Lowland Fir in the same manner. These facts put a somewhat different economic aspect on the Syrphidæ as a whole, as they have hitherto been considered entirely harmless or beneficial. For the work and interesting life-histories of these two Chilosias see Circular No. 61, U. S. Dept. Agriculture, entitled "Black Check in the Western Hemlock," by Mr. H. E. Burke.

15. *Chilosia plumosa*, Coquillett.

A single specimen taken by the writer at Glacier, Aug. 20, 1901, seems, after comparison with the type, to belong here without question. The species was described from Ormsby Co., Nevada, and has not to my knowledge been recorded elsewhere.

16. *Chilosia cyanea*, Hunter.

Port Renfrew, July 5, 1901, one specimen taken by the writer.

17. *Chilosia* sp.

Two female specimens taken at Hope Mts., July 19, 1906, and at Similkameen, July 20, 1906, by R. V. Harvey. These may be the undescribed female of some species of *Chilosia* already known from the male, but I am not able to fit them in anywhere. I hesitate to give them a new name in such a difficult group. The antennæ are plumose and dark in colour; scutellum with bristly hairs; tubercle much as in *C. tristis*, body metallic-black, with very short yellowish pile; legs black, yellowish at the knees; length, 7 to 8 mm.

18. *Chilosia* sp.

One female taken at Field, July 18, 1902, by the writer. The antennæ are lacking, and I cannot place it in any species known to me.

19. *Melanostoma coerulescens*, Williston.

Kaslo, July 2, 1903, R. P. Currie. (Determined by Coquillett.)

20. *Melanostoma trichopus*, Thompson.

Nicolum River at Hope, July 14, 1906, and Vancouver, July 7, 1906. Two specimens, by R. S. Sherman.

(*Melanostoma concinnum*, Snow.

Banff, Alberta, July 17, 1901. One specimen by R. C. Osburn.)

21. *Syrphus glacialis*, Johnson.

Vancouver, March, 9; Mission, April 4, and Hope Mts., July 19, 1906, by R. V. Harvey. The species was described from Alaska.

22. *Syrphus geniculatus*, Macquart.

Grouse Mt., July 3, 1904, and Vancouver, June 16, 1906, R. V. Harvey.

23. *Syrphus gennalis*, Williston.

Glacier, Aug. 20, 1902, R. C. Osburn, and Kaslo, June 4, 1904, J. W. Cockle.

24. *Syrphus quinquelimbatus*, Bigot.

A single male specimen taken at Mt. Cheam, Aug. 6, 1903, by R. V. Harvey, and one female in the U. S. National Museum from Mr. Coquillett's collection, taken by W. H. Danby, and labeled merely "Br. Columbia."

This species was described from a single female specimen from California (Ann. Soc. Ent. France, 1884, 91), and has not since been mentioned. The male taken by Harvey is sufficiently like the female in the National Museum, and agrees well enough with Bigot's description, so that there can be little doubt as to its identity. The last two abdominal bands on the posterior margins of segments 4 and 5 are wanting in the male. This is the only important difference in the sexes.

25. *Syrphus disjectus*, Williston.

Two female specimens taken by Harvey, Hope Mts., July 18, 1906, compare well with Williston's description of the male. They also agree with the female which Snow (Notes and descriptions of Syrphidæ, Kansas Univ. Quart., July, 1892) lists from Colorado, in having whitish pile and light-coloured lateral margins on the thorax.

26. *Syrphus insolitus*, sp. nov. (Fig. 1.)

Male.—Face, front and cheeks entirely shining bronze-black, with no indication of yellowish; with black pile on the face, front and vertex. Face and front rather swollen, the former nearly perpendicular below the antennæ; tubercle broadly rounded, not prominent. Antennæ dark brown, yellowish below on second and third joints. Occiput with black pile above and yellowish pile below. Thorax bronze-black, with light yellow pile on the sides and black and yellow mixed on the disc (in one specimen the whole disc is covered with black pile, and that on the sides is reddish). Scutellum yellow, with dark reflections, the extreme base black. Abdomen: first segment black, shining; segments 2, 3 and 4 opaque-black except the outer posterior angles, which are shining black, yellow as follows: a pair of spots on the middle of segment 2 attenuated at both ends and reaching forward at the outer ends to the margin, bands of the third and fourth segments entire, attenuated at their ends and nearly or quite reaching the lateral margins; segment 4 narrowly yellow on the posterior margin, and segment 5 with an inconspicuous yellow spot on the anterior outer angle. Hypopygium shining black. Legs: first and second pairs yellow, bases of the femora black; third pair dark, the knees lighter. Halteres yellow. Wings nearly transparent, slightly tinged with dark, stigma dark brown. Length 7 to 8 mm. (*insolitus* = unusual).

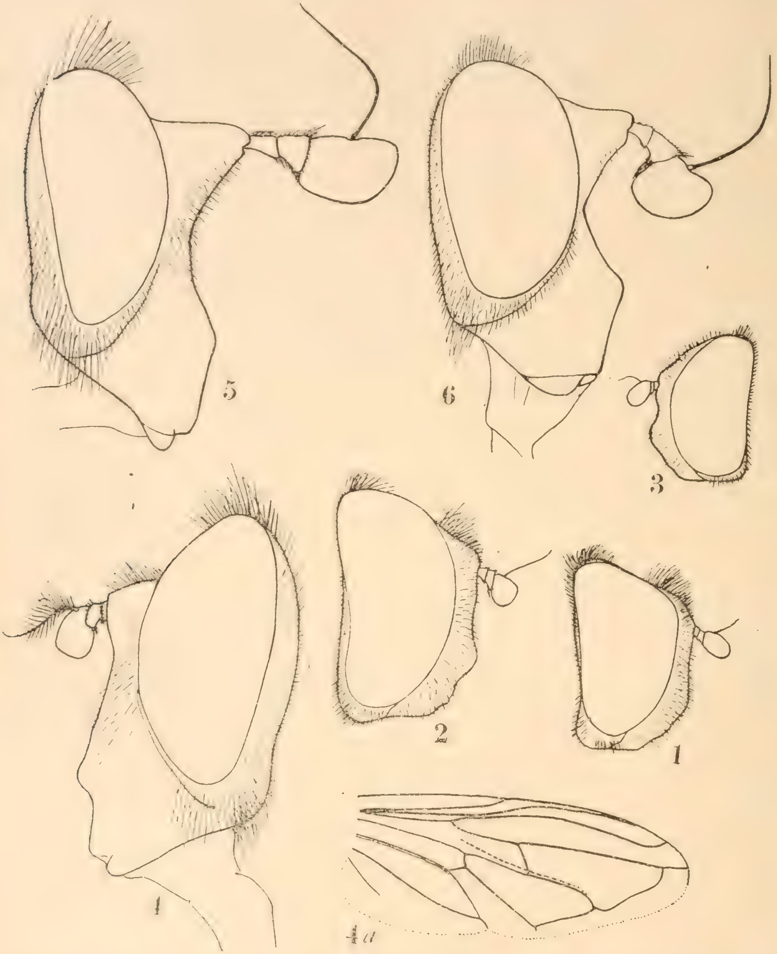

FIG. 1.—1, *Syrphus insolitus*, n. sp., Head of male; 2, *Syrphus conjunctus*, n. sp., Head of male; 3, *Xanthogramma tenuis*, n. sp., Head of female; 4, *Arctophila Harveyi*, n. sp., Head of male; 4a, wing of female; 5, *Sphecomyia occidentalis*, n. sp., Head of male; 6, *Sphecomyia nasica*, n. sp., Head of male.

Three males taken at Vancouver, April 13, 1906, by Mr. R. V. Harvey.

The species is easily distinguished from *S. gracilis*, Coquillett, which also has a shining black face, by the presence of three yellow cross-bands on the abdomen instead of one, by the yellow anterior legs and by the facial tubercle, which is low instead of prominent.

27. *Syrphus conjunctus*, sp. nov. (Fig. 2.)

Male.—Face dark yellow, descending almost perpendicularly to the small tubercle, cheeks shining black, the black continued around in front and up over the tubercle to the middle of the face, but interrupted behind the mouth on the oral margin by yellow; front and vertex black, the former with yellow pollen except near the antennæ. Pile of face, front and vertex black. Antennæ dark, third joint lighter below. Occiput with yellow pile. Thorax shining bronze-black, with some yellowish pollen on the disc, and with yellow pile, Scutellum large, waxy-yellow, pile yellow, with a fringe of dark hairs on the margin. Abdomen black, segment 1 shining, 2 opaque, 3 opaque except the lateral borders, 4 mostly shining, 5 and the hypopygium entirely shining; three broad yellow bands occupying the anterior half of the segments, on segment 2 the band is interrupted and the spots forming it are rounded at their inner ends and attenuated at their outer ends, where they attain the margin of segment; on segments 3 and 4 the cross-bands are complete, but are so deeply incised behind at the middle that they appear at first glance to be interrupted, each half evenly rounded behind, and attenuated at the outer end, where it attains the margin of the segment; segments 4 and 5 are margined with yellow posteriorly, and the outer anterior angles of 5 are yellow. Pile of abdomen mostly black, but yellow on the first two cross-bands. Anterior and middle legs reddish-yellow, black at the extreme base of the femora, and the tarsi infuscated; hind legs reddish-brown; a broad dark band covers most of the femur, and the distal three-fourths of the tibia and the tarsi dark. Halteres yellow. Wings hyaline, slightly infuscate anteriorly, stigma brown.

Length, 8 mm. (*conjunctus* = joined, referring to the apparently interrupted abdominal cross-bands).

Described from one male specimen. taken at Hope, on the Nicolum River, July 14, 1906, by R. V. Harvey.

Evidently related to *S. macularis*, Zetterstedt, but differs in having the eyes bare, and the black of the face and legs much more restricted, while abdominal bands 2 and 3 are incised but not interrupted.

28. *Syrphus* sp.

A somewhat teneral female, Glacier, Aug. 20, 1902, R. C. Osburn, I am not able to place in any species known to me.

29. *Xanthogramma divisa*, Williston.

One female taken by R. V. Harvey at Vernon, Aug. 14, 1904.

30. *Xanthogramma tenuis*, sp. nov. (Fig. 3.)

Female.—Face, cheeks and oral margin yellow, the yellow continued above on the sides of the front to the vertex. Vertex and middle of the front nearly to the antennæ bronze-black. Pile very fine and delicate, that of the face whitish, of the front and vertex black. The contour of the face below the antennæ is straight to the tubercle, which is rounded and moderately prominent. Thorax bronze-black, the lateral stripes yellowish, rather obscure; a large obscure whitish patch on the pleura. Scutellum yellow, with dark reflections, the anterior angles blackish. Pile of the thorax and scutellum yellowish, very delicate. Abdomen black, somewhat shining, yellow as follows: a spot on each side of segment 1, cross-bands on the anterior part of segments 2, 3, 4 and 5 interrupted at the middle and reaching the margin broadly; segments 5 and 6 very narrowly yellow on the posterior border. Legs yellow, a broad dark ring on the hind and middle femora and tibiæ, and the hind tarsi infuscated. Halteres yellow. Wings hyaline, stigma yellow.

Length, 7 mm., a weak-looking, delicate species (*tenuis* = slender).

One specmen taken by Mr. R. V. Harvey in the Hope Mts., July 27, 1906.

This species resembles most *S. emarginata*, Say, but differs from it in the facial contour, the interrupted abdominal cross-bands, the smaller size and more slender form.

31. *Toxomerus (Mesogramma) boscii*, Macquart.

Kaslo, June 11, 1903, H. G. Dyar. (Identified by Coquillett.) This species, formerly known only from south-eastern North America, has recently been recorded by Chagnon from Montreal, and by Washburn from Minnesota.

32. *Hammerschmidtia ferruginea*, Fallen.

Kaslo, June 15, 1903, R. P. Currie, and June 14, 1906, J. W. Cockle. The specimen taken by Mr. Cockle is much darker than any others I have seen, so much so that its general aspect is dark instead of reddish. On closer inspection in strong light the ground colour appears through the darker pigment. A specimen from Ft. Morrison, Colorado, in the U. S. National Museum, is intermediate in colour.

33. *Brachyopa notata*, O. Sacken.

April 13, 1906, at Vancouver, ten specimens taken at cherry bloom by R. V. Harvey; April 28, 1906, R. S. Sherman.

34. *Arctophila Harveyi*, sp. nov. (Figs. 4, 4a.)

Male.—Face yellow, with fine yellow pile; a shining black stripe descends from the base of the antennæ over the tubercle, which is quite small, to join with the black shining oral margin and cheeks. Front black, thickly whitish pollinose, and with short black pile. Antennæ reddish, third joint quadrangular, the corners rounded; arista basal, plumose. The antennæ are inserted on black ground. Vertex black, shining, with black pile. Thorax and scutellum black, shining, covered with a thick coat of pile, which is yellowish on the pleura and anterior two-thirds of the thoracic dorsum, but jet black on the posterior third and the scutellum; a fringe of light pile projects from underneath the scutellum behind. Abdomen black, shining, tip of the fourth segment margined with red; pile of the second segment black, that of the third mixed black and yellowish, that of the remaining segments yellowish. Legs black, knees reddish-brown, tips of tibiæ and basal joints of tarsi lighter; pile of legs abundant, mostly black. Halteres piceous. Wings hyaline, with an ill-defined, dilute brownish cloud about the base of the submarginal cell; stigma yellow; third vein entirely straight.

Female.—Similar to the male in all essential respects. The pile of the front and vertex is yellow, intermixed with a few black hairs on the vertex. On the thorax the yellow pile extends back almost to the scutellum. The legs are slightly lighter in colour.

Length, 13 to 15 mm.

Described from one male taken on Mt. Cheam, Aug. 11, 1903, and one female from Hope, July 12, 1906. Both specimens were taken by Mr. R. Valentine Harvey, after whom I take pleasure in naming the species.

The genus Arctophila has heretofore been known in America by only one species, *A. flagrans*, O. S., and in Europe by two species, *A. bombiformis*, Fallen, and *A. mussitans*, Fabricius. From all of these *A. Harveyi* differs in having the third vein entirely straight. Otherwise it conforms closely to the generic description. *A. Harveyi* can be distinguished at once from *flagrans* by the black pile of the thorax and by the black facial stripe.

35. *Eristalis Meigenii*, Weidemann.

One female from Vernon, Sept, 9, 1904, and a male from the same locality, Aug. 15, 1906, both taken by R. V. Harvey.

36. *Helophilus similis*, Macquart.

Kaslo, June 3, 1903, H. G. Dyar, and July 20, 1903, R. P. Currie; Vernon, Aug. 15, 1904, R. V. Harvey.

37. *Helophilus conostomus*, Williston.

One specimen taken by Harvey at Vernon, Aug. 12, 1904.

38. *Helophilus porcus*, Walker.

As far as I am aware this species has never been recorded since Walker described it (List, etc., III, 551), and recorded it for the Hudson Bay Territory. Osten Sacken (Cat. Dipt., 250, note 235) says: "It is represented in the British Museum by two (male and female) specimens. I have never seen it elsewhere." There are in the U. S. National Museum three unrecorded specimens, one male from Ottawa, Canada, and a male and female from North Mt., Pennsylvania, taken June 8 by Mr. C. W. Johnson. The specimen in my possession, from British Columbia, was taken at Kaslo by Mr. J. W. Cockle (date not given). The species, though apparently rare, seems to be of wide distribution through boreal America.

39. *Merodon equestris*, Fabricius.

This species has been taken previously a number of times in America, but it has always been assumed that it was in each case an accidental introduction from Europe in plant bulbs in which the larvæ live. The occurrence of the species in several localities, and especially the number taken in British Columbia, make it seem certain that it properly belongs to our North American fauna. Mr. Harvey has taken numerous specimens at Vancouver, frequenting especially the flowers of the Salmon-berry *(Rubus spectabilis).*

40. *Xylota marginalis*, Williston.

A male of this species taken by Harvey at Duncan, April 19, 1906, agrees in all respects with Williston's type from the White Mts. of New Hampshire. The species has also been taken in New York, but never before in the west.

41. *Ferdinandea (Chrysochlamys) croesus*, O. Sacken.

A male of this fine species was taken by Harvey at Victoria, June 8, 1906, on a flower of the Yellow Hawk-weed (Hieracium). The species has previously been known from Utah and Washington southward.

42. *Criorhina Coquilletti*, Williston.

One female taken by Mr. J. W. Cockle at Kaslo, April 30, 1906.

The female lacks the bronze of the thorax and abdomen, and has bunches of yellow pile on the anterior " corners " of the abdomen, and is also somewhat larger, measuring 13 mm. Otherwise it agrees closely with Williston's description of the male from southern California. The U. S. National Museum has a specimen from Hoquiam, Washington, collected by Mr. Burke.

43. *Criorhina armillata*, O. Sacken.

Kaslo, June 18, and Bear Lake, July 21, 1903, R. P. Currie; Vancouver, April 13, 1906, on cherry bloom, by R. V. Harvey.

44. *Brachypalpus sorosis*, Williston.

Kaslo, June 12, 1903, one specimen by R. P. Currie. (Identified by Coquillett.)

45. *Brachypalpus parvus*, Williston.

One male and three females from Quamichan Lake by A. W. Hanham, and one female from Kaslo by J. W. Cockle. These specimens agree closely with Williston's description of the male from Colorado, the only previous record for the species as far as I am aware. The only point of any importance in which they disagree from the description is in the presence of short bristles on the under side of the hind femora, but for that matter so do my specimens of *B. Rileyi*, Williston, from Ohio, so that this is either a matter of variation in both species or else Professor Williston overlooked the point in his descriptions.

The female is similar to the male, but the pile of the body is lighter in colour, and while in the male there are a few black hairs intermixed with the yellow on the vertex and thorax, in the female there is no black pile. The yellow of the legs is more extensive in the female. In size my specimens range from 7 to 10 mm.

46. *Temnostoma æqualis*, Loew.

One male at Kaslo, July 17, 1906, by Mr. J. W. Cockle.

47. *Temnostoma alternans*, Loew.

Kaslo, July 21, 1903, by Mr. J. W. Cockle. (Identified by Coquillett.)

48. *Sphecomyia brevicornis*, O. Sacken.

Three specimens, one male and two females, taken at Kaslo, May 6 and 26, 1905, by Mr. J. W. Cockle. The female, which has not hitherto been described, agrees with the male in every particular, except, of course, the separation of the eyes. My specimens measure considerably larger than those of Osten Sacken, being 14 to 15 mm. The species has heretofore been known only from California.

49. *Sphecomyia occidentalis*, sp. nov. (Fig. 5.)

Male.—Head shaped about as in *S. brevicornis*, but the tubercle is fuller and more rounded, and the face more concave below the antennæ. Cheeks and oral margin shining black. Face entirely covered with dense yellow pollen, which is continued above around the base of the antennal prominence. This prominence, which is shining black, points forward as in *S. brevicornis*, and is not tilted upward as in *S. vittata*. The antennæ are brownish-black, with a black, bare, basal arista; the first two antennal joints are about equal in length, the third somewhat longer and nearly as broad as long, rounded below and nearly straight above, the upper outer corner being quite angular. Pile of vertex black. Thorax black, shining, with black pile intermixed with some yellow, and with yellowish markings as follows: in front, on either side of the midline is a small spot which is continued backward as a faint line, on the humerus another rounded spot, and on the transverse suture another, an elongate spot above the postalar callosities, and a transverse line in front of the scutellum, which in some specimens is connected with a faint mid-dorsal line; on the mesopleura is an oval spot, and under it on the sternapleura a smaller round spot. The scutellum is entirely black, with black pile above and yellow on the sides. Abdomen black, with yellow bands and yellow pile. The bands are as follows: A rather narrow band on the posterior margin of segments 1 to 4, a broader interrupted band across the middle of the black portion of segments 2 to 4 (on segment 4 of some specimens this band is near the anterior margin of the segment, and it may be connected slightly with the posterior band at the lateral margin); all the bands reach the margin. On the venter there are yellow cross-bands, interrupted at the middle, on the anterior margin of segments 2 to 4. The hypopygium is black, with some yellow pollen and with black and yellow pile. Legs yellowish, the femora all brown except the tip, the posterior pair lighter than the others; tibia with a brownish ring about the middle, most distinct on the anterior pair, sometimes entirely wanting; distal tarsi infuscated. Wings clouded with brownish, especially along the veins, stigma yellowish-brown. Halteres yellow.

Female.—Similar to male in all essential respects. The fifth segment of the abdomen is marked like the fourth. The front is considerably wider than the vertex, while in the male the eyes are narrowly separated. There is a shining black facial stripe extending rather broadly from the tubercle to the base of the antennal prominence, and extending narrowly above to the insertion of the antennæ, and below to the oral margin, where, however, it is not continuous with the black of the cheeks.

Length, 13 to 14 mm. (*occidentalis* = western).

Described from eight males and one female taken as follows: Glacier, Aug. 21, 1902, R. C. Osburn; Vancouver, May 2, 1903; May 9, 1903 (the female); April 23, 1904; April 28, 1906, and Grouse Mt., July 19, 1903, R. V. Harvey; Vancouver, April 21, 1906, and Mission, April 13, 1906, R. S. Sherman; Hoquiam, Washington, April 29, 1904, H. E. Burke. (The last mentioned was kindly lent me by Mr. Coquillett, of the U. S. National Museum.) Mr. Harvey notes the capture of his specimens on blossoms of *Vaccinium parviflorum*, in company with wasps.

The specimen taken by myself was mentioned in my former list (Can. Ent., Vol. XXXVI, Sept., 1904, p. 262) as doubtfully belonging to *S. Pattoni*, Will. Since then the study of better material, and especially a comparison with the type specimen of *Pattoni*, show it to be entirely different. The absence of a facial stripe in the male, the entirely black scutellum, and the colour markings of the thorax and scutellum (which appear to be very constant) easily distinguish the species.

50. *Sphecomyia nasica*, sp. nov. (Fig. 6)

Male.—Head a trifle broader than the thorax. Face produced downward, deeply concave below the antennal prominence, the lower part of the face with the tubercle projecting prominently forward and downward. Face and front covered with a dense coat of yellowish pollen, the black ground colour appearing on the forward projecting antennal prominence. Cheeks shining black. Antennæ very short, scarcely more than half of the vertical length of the eye; third joint considerably broader than long, brownish-black, and with a long and rather stout black arista. Vertex shining black, with black pile. Eyes narrowly separated. Thorax black, shining, with short black pile, which is intermixed with yellowish anteriorly, bunches of yellow pile on the pleura and postalar callosities; a distinct yellowish pollinose spot on the humerus, and a fainter one adjoining it above, an oval spot on mesopleura and a rounded one below this. Scutellum entirely bronze-black, with yellow pile. Abdomen slightly narrower than thorax, the sides nearly parallel, black, yellow pilose, and marked with yellow as follows: on segment 1 the shining black is partly obscured by yellow pollen, segments 2, 3 and 4 each with one cross-band of moderate width, situated somewhat nearer the base of the segment, the band on segment 2 is interrupted at the middle, and does not reach the margin, while the others are entire, and attain the lateral margin. The extreme posterior margin of segment 2 is shining, and also the lateral margins, leaving an H-shaped velvety-black area; segments 3 and 4 are velvety-black in front of the cross-band and shining behind it. Hypopygium shining black. Venter with yellow cross-bands on segments 2 and 3. Femora black except narrowly at the knees; tibiæ yellow, with a dark spot on distal half; the front and middle tarsi have the basal joints yellow and the distal joints dark, the posterior tarsi are dusky, with the distal joints darker. Halteres yellow. Wings brownish, especially toward the costal border.

Length, 13 mm. (*nasica* = referring to the nose).

Described from a single specimen taken in the Hope Mts., July 27, 1906, by Mr. R. S. Sherman.

To include the new species of Sphecomyia, I have amended Williston's table (Synopsis N. A. Syrphidæ, p. 257) as follows:

1. Antennæ very long, third joint short .... *vittata.*
   Antennæ shorter than head .... 2.
2. Scutellum yellow at base; a complete black facial stripe from antennæ to oral margin .... 3.
   Scutellum entirely black; facial stripe wanting in male (there is in the female of *occidentalis* a stripe which is attenuated at both ends) .. 4.
3. Yellow cross-bands of abdomen very broad .... *brevicornis.*
   Cross-bands narrow .... *Pattoni.*
4. Abdominal segments 2 to 4 each with two yellow cross-bands .... *occidentalis.*
   Abdominal segments with only one yellow cross-band .... *nasica.*

ARGYNNIS ASTARTE, DOUBL.-HEW.

BY HENRY SKINNER, M.D., PHILADELPHIA.

This was the butterfly we did not get. Dr. James Fletcher and the writer arrived at Lake Louise, in the Rocky Mountains of Alberta, on the second day of August. One of the insects we were most anxious to obtain was *Argynnis astarte*, described in 1848, and not rediscovered until 1888. Dr. Fletcher said Mr. Bean had taken the species on the very summit of Mt. St. Piran, so we made the ascent of that peak. When we arrived at the rocky top, the temperature was below freezing and snow was falling and the wind blowing a fearful gale. Dr. Fletcher captured a specimen of *Chionobas Beanii* at a time when the sun shone through a break in the clouds. A butterfly came toward me as though it had started from the South Pole, and when I raised my net to make a stroke it turned and made for the North Pole, and, as far as I know, never stopped until it reached there. I feel sure it was *astarte*. The weather continued bad during our brief stay in the mountains, and we did not get this interesting species. It is said in a general way that the species is found about the tops of the Rocky Mountains of Canada, and this article is a contribution towards our knowledge of its habitat. It is quite interesting, and perhaps important, to know the exact places where species are found. Mr. Bean says it occurs on a mountain, three miles south-west of Laggan, 8,500 ft. altitude, and on a low smooth mountain directly north of Laggan. He also says it occurred at Lake Agnes in 1892.

Mrs. Nicholl says: "Everywhere *Brenthis astarte* was to be seen, though not generally to be caught, on every peak over 8,000 ft." The males haunt the summits, and the females are to be found on the highest grassy slopes. Mrs. Nicholl records it from Glacier Crest, Selkirk Mountains. Mrs. Chas. Schæffer recently presented two specimens to the Academy of Natural Sciences of Philadelphia, which were taken on Mt. Athabasca (7,200 ft. alt.?). She says it has also been taken on Mt. Temple, above the saddle. Mr. Wolley Dod records it from Devil's Lake, near Banff. Mr. N. Sanson captured a specimen on Sulphur Mountain at Banff. From the above records, where should a collector go to get the species? It is no joke to climb these mountains, and one cannot step from the top of one to the top of another on the basis that they are flying around nearly all the peaks over 8,000 ft. altitude. Some of the localities mentioned are exact and some are not. It would be far better to give the names of the peaks where any butterfly is found, and if possible the altitude of the place of capture. Mr. Bean gives a very interesting account of the altitudes where he worked, but does not name the peaks. Perhaps they were not named when he was at Laggan.* I wish to pay tribute to the valuable work done by Mr. Bean in making known the butterfly fauna of this region.

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*This was actually the case with most of the mountains at Laggan in 1890, when Mr. Bean rediscovered *A. astarte*.—[Ed. C. E.

NOTE ON PLUSIA PRECATIONIS AT PETUNIA BLOSSOMS.

BY A. F. WINN, WESTMOUNT.*

During the past summer the Westmount Park gardener devoted to Petunias a circular bed about 20 feet in diameter, and knowing the fondness of the Plusias for the blossoms of this plant, I paid a little attention to it, my original intention being to see how many species I would find visiting it.

The flowers were of the old-fashioned single kinds, small blossoms, but hundreds of them, and were of three colours: first, a deep magenta or purple; second, a pale, washed-out looking variety of same, and third, pure white.

My first visit was on August 17, before dusk, and I had not long to wait, as while it was still quite light two Plusias appeared and quickly took a head-first plunge into the funnel-shaped blooms. They were easily boxed, and proved to be both *P. precationis.* A number of others soon followed, flying about among the blossoms, and I was struck with an unexpected circumstance, that they were all selecting the dark-coloured blooms. This seemed remarkable, as white colour in flowers has been considered a sort of special guide for crepuscular and night-flying moths. The colour of the Plusias matched so well that of the blooms in the now fading light, that I wondered whether, when darkness actually set in, the moths would adjourn to the white blooms, so walked around and around the bed, watching developments, doubtless to the amusement or mystification of the park frequenters. After a while a moth fluttered over the bed, and went boldly into a white blossom. I tried to box it, but was in too great a hurry and missed, but saw that it was no Plusia. Next moment I had it, or another —*Cucullia intermedia.* There were soon lots of them, and without exception they selected the white blooms, while the Plusias kept to the dark ones, and long after it was so dark that one could see only the swaying blossoms by the light of the nearest street lamp, they kept to their respective colours. The result of the evening's catch was 67 *Plusia precationis* and 23 *Cucullia intermedia*, and nothing else. Not a single moth was seen to get into the tube of any of the washed-out coloured blossoms, though they were continually fluttering past. On several other evenings up to the 8th September, the same two moths were the sole visitors of the Petunias.

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*Read before Montreal Branch, Entomological Soc. of Ontario, Nov. 9, 1907.

NEW SPECIES OF COLORADO APHIDIDÆ, WITH NOTES UPON THEIR LIFE-HABITS.

BY C. P. GILLETTE, FORT COLLINS, COLORADO.

(Continued from Vol. XXXIX, page 396.)

Myzus Braggii, n. sp. (Plate 1, figs. 1, 2, 3).

A beautiful pale yellowish or greenish-yellow louse, with bluish-green markings; upon Canada thistle, *Carduus arvensis*.

Winged Male (Fig. 3).

Described from specimens taken at Fort Collins, Colo., Oct. 26, 1906.

General colour light yellow, or greenish-yellow. Head, thorax, antennæ, tarsi and distal ends of tibiæ black or blackish. The dorsum of the abdomen has black transverse bands on all of the segments, except the first two. Femora black in distal two-thirds, but light near the coxæ. The pleuron of the mesothorax, the coxæ, more or less of the cornicles, about four or five spots on either lateral margin of the abdomen, the beak except at base, the subanal and subgenital plates, and the nervures of the wings, dusky brown to blackish in colour. Eyes dark red; cauda pale yellow; cornicles .40 mm. long, slender, cylindrical, straight, or very slightly curved, and with flange at free end. Length of body, 1.80 mm.; length of wing, 3 mm.; length of antennæ, 2.30 mm. Prothorax without lateral tubercles, a slight tubercle on vertex of head for ocellus. Joints of antennæ measure about as follows: III .51, IV .43, V .37, VI .11, and VII .90 mm. The sensoria are abundant on segments three, four and five. They are oval and placed with their greater diameters across the antennal segments. A cluster of about six or eight sensoria are placed at the end of segment six.

Winged Viviparous Female (Fig. 1).

Described from specimens taken at Fort Collins, Colorado, Oct. 5, '07.

In general appearance hardly unlike the male described above, but differs by being a little larger (about 2 mm. long), by having the black colour upon dorsum of the abdomen in a solid rectangular patch on joints 3, 4 and 5, by having a transverse band on joint 6, and by lacking the black tip to the abdomen, but with subgenital plate dusky. Sensoria abundant on joints 3, 4 and 5 as in the male; cornicles slender, a little curved and .50 mm. long.

Apterous Viviparous Female (Fig. 2).

The ground colour of this female is very pale greenish-yellow, with a broad but more or less obscure dark stripe of green extending over the thorax and abdomen about midway between the median and lateral lines of the dorsum upon either side. In some specimens, however, the green colour is quite distinct and pronounced. The whole body, in some specimens, is tinged more or less distinctly with flesh colour, the head being the lightest. The distal portions of the antennæ, tibiæ, cornicles, beak and the entire tarsi infuscated; eyes dark red; entire length of body 2 mm.; antennæ 2 mm. Joints of antennæ about as follows: I and II together .10 mm.; III .40, IV .34, V .31, VI .10, and VII .80 mm. Cornicles .70 to .80 mm. long, gently curved in form and quite slender. Style rather long, upturned. The body has many capitate hairs, but there are none of these hairs upon the antennæ or legs; the tubercles for the antennæ are quite prominent and slightly gibbous. The first joint of the antenna is much larger than the second, and strongly gibbous on the inner side, giving the appearance of receiving joint 2 upon the outer side. There is a slight frontal prominence bearing two capitate hairs; prothoracic tubercles wanting. The lice have been so numerous upon the thistles as to utterly kill many of them.

Apterous Oviparous Female.

Mr. Bragg and I have been searching for the oviparous females for at least two weeks, and those obtained to-day (Oct. 5, '07) are the first that we have noticed this season, although I saw a few eggs upon thistles one week ago. There certainly is not more than one oviparous female to 100 males upon the plants at this time. The eggs are bright yellow in colour when first deposited, but gradually change to black. I am able to find but very few of these upon the stems and leaves of the thistles, but they are scattered in small numbers over the plants. This form closely resembles the apterous viviparous form. A technical description has not been made.

The Pupa.

The pupæ are light greenish-yellow in general colour, with two longitudinal dashes running over the mesothorax, with a large green spot on either side of the first segment of the abdomen, and with a broken longitudinal line of green on either side of the dorsum of the abdomen extending over segments three, four, five and six. This green colour is a very conspicuous marking upon the light background of the general colour of the pupa.

I find that my winged males for a time retain the green colour markings that are so prominent on the apterous females and the pupæ. After a few hours' exposure to the daylight these winged males lose the green colouring and take on the dark colouring of the abdomen mentioned above. All of the individuals seem now (Oct. 5) to be acquiring wings, and, so far as I can find, all are becoming males, although I find an occasional yellowish-green egg that probably is being deposited by oviparous females upon the stems of the thistle.

The Canada thistle upon which this louse has been found occurs upon a small area in the suburbs of Fort Collins, where the seeds were introduced some twenty years ago. I have never seen the thistle in the surrounding country, and neither Mr. Bragg nor myself have ever found this louse upon other food-plants, but it seems probable that such must occur here. The lice have been most abundant during the month of October, and we have not seen them during the spring or summer months, though carefully searched for. The lice are rather broad and flat, and so near the colour of the leaves of the thistle that they are seen with difficulty unless very numerous.

Myzus vincæ, n. sp. (Plate 1, figs. 4, 5).

Alate Viviparous Female (Fig. 5). Type specimens taken at Fort Collins, Nov. 11, 1907, upon *Vinca* sp. in the College greenhouse.

General colour pale greenish-yellow. Head, antennæ, transverse band on pronotum, mesothorax above, laterally and beneath; a transverse band upon each segment of the abdomen dorsally, spots along lateral margins of the abdomen, cauda, subanal and subgenital plates, tarsi, distal ends of femora and tibiæ, and beak, except at base, black or blackish; eyes dark red. Upon segments 3 to 5 of the abdomen the bands unite to form a large blotch.

Body, 1.70 mm.; antenna, 2.37 mm.; cornicles, .29 mm.; wing, 3.20 mm.; cauda, .13 mm. Antennal joints: III .50, IV .45, V .37, VI .15, VII .73 mm. Cornicles cylindrical, with distinct flange at apex; 3rd joint of antenna with about 15 sensoria that are scarcely tuberculate; no sensoria on joint 4; cauda tail-like, upturned; beak barely reaching 3rd coxæ; antennæ upon moderate frontal tubercles, the inner sides gibbous, as are the inner sides of the first joints of the antenna; lateral tubercles of prothorax wanting. A few red specks, the eyes of embryo lice, can usually be seen over the abdomen. In some examples segments 2, 3, 4 and 5 of the abdomen have black transverse dashes near their lateral margins.

Apterous Viviparous Female (Fig. 4).

Colour light yellowish-green, with black markings above and dark red eyes; cauda concolorous with body, antenna, legs and cornicles light yellowish-brown; distal ends of joints 3, 4 and 5 and all of joints 6 and 7 of antenna and extreme ends of cornicles and tarsi black; distal ends of tibiæ slightly infuscated.

Length of body, 1.90 to 2.10 mm.; antenna, 2.70 to 2.80 mm.; cornicles, .45 mm, cylindrical or slightly enlarged towards base, slightly bent, and the distal end with a rather strong flange. Joints of antenna about as follows : III .65, IV .52, V .40, VI .18, VII .79 mm. Antennal tubercles strongly gibbous, and first joints of antennæ moderately gibbous; cauda conical and upturned. A few of the eyes of embryos usually show as bright red specks in the abdomen. No dark markings on ventral surface.

The black coloration above consists of rather broad irregular transverse bands, one for each segment of the thorax and one each for joints 2, 3 and 4 of the abdomen, the last being broadest and the only one that extends across the middle of the dorsum, the others being cut by a median light portion concolorous with the rest of the body.

It seems probable that some of the past references to *M. dianthi* are really of this species.

I hesitate to call this a new species, but have been unable to find a description that will fit it. It is closely allied to the *persicæ*, *dianthi*, *achyrantes* group, especially in the alate form.

Mr. Bragg has taken this louse upon liliaceous plants, asparagus, asparagus fern, Aquilegia and Rumex sp. in the greenhouse, and it was sent me from Boulder, Colorado, by Professor T. D. A. Cockerell, who found it in large numbers upon a lily indoors. I have taken it repeatedly upon *Vinca* and asparagus in greenhouses. Mr. Bragg tells me he has found it colonized upon several other greenhouse plants which he has not noted. It is evidently a very general feeder when abundant. Sexual forms and eggs have not been found. There are many apterous but few alate forms in the College greenhouse at this date, Nov. 20, '07.

Callipterus robiniæ, Gillette. (For description see Vol. XXXIX, page 395.)

Winged viviparous female, plate 1, fig. 6; oviparous female, fig. 7; winged male, fig. 8.

This louse is solitary in its habits, and the winged forms are very active jumpers upon being approached. It has been fairly common, but not abundant, upon the under side of the leaves of the black locust in Denver and about Ft. Collins for the past two years. On November 9th, after the leaves had nearly all fallen, I saw the oviparous females with their long-drawn-out abdomens depositing eggs upon rough places in the bark of small limbs of locust trees in Denver parks.

EXPLANATION OF PLATE 1.

Figures 1, 2 and 3, alate viviparous female, apterous viviparous female and alate male of *Myzus Braggii*, n. sp. Figures 4 and 5, apterous viviparous female and alate viviparous female of *Mizus vincæ*, n. sp. Figures 6, 7 and 8, alate viviparous female, apterous oviparous female and alate male of *Callipterus robiniæ*, n. sp. All enlarged 15 diameters. Original; Miriam A. Palmer artist.

ADDITIONS TO THE LIST OF MANITOBAN LEPIDOPTERA.

BY E. FIRMSTONE HEATH, CARTWRIGHT, MAN.

A good many fresh species and some few new to science have been taken in Manitoba since the publication of my list in 1904—additional to that by Mr. A. W. Hanham, then residing in Winnipeg, which appeared in this magazine a few years previously. Before giving my record I may make some remarks upon the appearance, disappearance and apparent migration of some species, which, I trust, will prove interesting.

When first I began to collect here, about 25 years ago, *Pieris protodice*, Bd. and Lec., was the only white butterfly and was abundant. Then a few stragglers of *P. rapæ*, Linn., appeared, and the number of *protodice* became gradually less and less; now it has entirely disappeared, and we have to wage war with *rapæ* in order to grow a few members of the cabbage family in our gardens. Last year this species made a clean sweep where pyrethrum powder was not used. In my own garden it fell back upon a bed of mignonette, greatly to its detriment. In England *rapæ*, with its relative *brassicæ*, is kept in check by a small ichneumon fly; here it seems to be unmolested, and it seems desirable to import the parasite.

Colias cæsonia, Stoll., appeared here some years ago and in some numbers. I caught two and saw many more flitting over growing grain where they could not be followed; none have been seen since.

Vanessa Californica, Bdv., has appeared twice at dates several years apart. *Pyrameis Huntera*, Fabr., is also of very uncertain occurrence.

Some of the Theclas used to be plentiful—now they have all disappeared. Likewise many of the Pamphilas that I used to take are no longer to be found.

Argynnis Edwardsii, Reak., a green-winged species, appeared in numbers some years ago. I took a couple of dozen, and could have taken more. It disappeared as suddenly as it came, and not one was seen during the following season.

With both butterflies and moths—especially the latter—there seems to be a gradual and constant migration from the south west, northwards as far as Manitoba, but very little movement from due east to the westward, or *vice versa*. The cool, high land north of Lake Superior seems to form a barrier to migration from Ontario, and the bare, treeless plains to our west are an obstacle to Albertan species. Still, some forms new to science occasionally appear, and it is a puzzle to know whence they came. In the south-eastern part of this Province there is much roughly-wooded land, mostly unfit for agriculture, and in it I do not think there is a single collector. The few we have are nearly all in the central portion of the Province, and I alone am near the southern boundary.

I have taken a few specimens during the last two years of *Rhizagrotis perolivalis*, Smith, a species which was, I believe, originally taken near Calgary in Alberta, and during the same years some six or seven examples of *Xylophasia Miniota*, Smith, came to my sugared trees during the early part of June. Miniota, where the first specimens were taken that reached Dr. J. B. Smith, and hence the name, is about the centre of the western boundary of Manitoba. The species is a large and conspicuous one, as large as *Hadena devastatrix*, Brace, and one that could not possibly be overlooked by a collector. It is strange that it should simultaneously appear in two places so far apart.

Euxoa focinus, Smith, was taken by me for the first time in 1906.

In, I think, 1884 *Deilephila lineata*, Fabr., was very plentiful, so much so that I only took the trouble to catch two or three. I have not seen it since. The other species, *D. Chamœnerii*, Harris, is generally to be seen at bloom in the early summer.

In 1905 I took at sugar about two dozen of *Dargida procinctus*, Grote, prior to which date I have only taken a couple ; in 1906 I did not see one. Whole genera have disappeared, but this may in great measure be attributed to the destruction of food-plants by cultivation and by cattle. I have not taken an Hydrœcia for some years, thanks to my sheep having cleared up all the weeds in the scrub and in the paddocks round about my house. The Leucanias and the Plusias have also been very scarce lately—probably from the same cause. I do not think I have taken an Arctian imago or seen a larva for the last two or three years ; the same may be said of the genus Schinia.

The Chorizagrotis genus has, on the other hand, come out strongly. I have now taken six out of the eight species listed ; during the earlier years of my collecting I rarely met with it. The first species to be captured was *C. introferens*, Grote, and the others followed. With regard to Geometers the case is somewhat different ; they may be here, but the weather may be unfavourable for them to come to light or to be much on the wing. The same with the Micros ; I have taken hardly any for the last two seasons. In 1906 our few species of Sphingidæ seemed to have disappeared ; perhaps owing to the weather, light had no attraction; at all events, I did not get any, while in some previous seasons they were a perfect nuisance, as I had to kill them off my windows before I could take other things that I wanted.

I have been exchanging a little lately with brother collectors in Saskatchewan and Alberta, and have been much struck by the apparent differences between specimens of the same species taken here and those from localities 500 to 800 miles further west. So much is this the case that Manitoban species, in some instances, are hardly to be recognized at first from descriptions made from western examples.

Besides those mentioned in the following list, I have some six or seven Noctuids which have been seen by Dr. J. B. Smith, and regarding whose names—if they have any—he will give no opinion without further material; among these are two Polias and some Euxoas. Some of the names in my list are taken from Dr. Fletcher's Record in the Reports of the Entomological Society of Ontario.

I wish again to thank Dr. J. B. Smith for his unvarying patience and kindness in identifying species for us poor collectors out in the wild western country. Where no locality is given in the following list, the species was taken upon my own farm:

Acronycta cretata, Sm.—At sugar in the early part of July. I have taken several specimens during the last three or four years, but never in any large numbers.

Acronycta speratina, Sm.—I understand that Dr. Smith now says that what we had formerly named *sperata*, Grote, is a new species.

Hadena cerivana, Sm.—Several during the last few years, both at bloom and at sugar, but never abundant.

Hadena exhausta, Sm.—Several at sugar in the beginning of July.

Hadena Barnesii, Sm.—Aweme (Criddle), Aug. 22.

Xylophasia Miniota, Sm.—Several at sugar in June; also at Miniota.

Homohadena fifia, Dyar.—More abundant here than the paler *badistriga* with the white secondaries. At light during the summer.

Ancocnemis iricolor, Sm.—At light, Aweme, Sept. 9.

Rhyncagrotis scopeops, Dyar.—Or something very much like it. Several taken with *alternata* at sugar during August.

Rhyncagrotis minimalis, Grote.—At sugar in August; rare.

Rhyncagrotis anchocelioides, Guen.—Formerly listed as *cupida*.

Agrotis aurulenta, Sm.—Aweme, June 16, 1904.

Noctua substrigata, Sm.—Rounthwaite (Marmont).

Chorizagrotis inconcinna, Harv.—Several of this variable species flying about currant bloom, etc., in June.

Rhizagrotis perolivalis, Sm.—Two taken for the first time in 1906 at bloom.

Euxoa focinus, Sm.—Two taken at sugar, July 20; first appearance.

Euxoa acutifrons, Sm.—Two taken at sugar, Aug. 26, 1904, and Sept. 10, 1905.

Anytus profundus, Sm.—With *privatus* at sugar, occasionally.

Fishia Yosemitæ, Grote.

Mamestra juncimacula, Sm.—At sugar in July; scarce.

Mamestra Columbia, Sm.—Listed as *M. meditata*, Grote.

Mamestra Tacoma, Streck.—Sometimes rather plentiful at bloom.

Mamestra cuneata, Grote.—One only, at sugar, July 4, 1904.

Mamestra acuterrima, Sm.—At sugar in July; sometimes plentiful.

Mamestra pensilis, Grote.—Listed as *vicina*, Grote.

Mamestra larissa, Grote.—Listed as *anguina*, Grote.

Leucania multilinea, Walk.—Two or three taken at light.

Xylina innominata, Sm.—Listed as *signosa*, Grote.

Xylina merceda, Sm.— } Plentiful at sugar of late years in Sept.
Xylina ancilla, Sm.— } and Oct.

Papaipema Harrisii, Grote—One only, at sugar.

Orthosia Americana, Morr.—One at sugar, Aug. 8, 1904.

Orthosia helva, Grote.—One at sugar, Sept. 7, 1904.

Orthosia verberata, Sm.—At sugar occasionally with *bicolorago*, Guen.

Nycterophaeta luna, Morr.—Aweme, June 23.

Pseudotamila Avemensis, Dyar.—Aweme.

Melicleptria sexata, Sm.—Aweme.

Pæctes oculatrix, Guen.—Aweme, June 20.

Aletia argillacea, Hubn.—One at sugar, Sept. 30, 1905.

Drasteria distincta, Neum.—One or two occasionally.

Syneda Hudsonica, G. & R.—Listed as *Melipotis limbolaris*, Geyer.

Catocala crataegi, Saund.—Fairly abundant at sugar.

Catocala abbreviatella, var. Whitneyi, Dodge.—Rare; only two taken.

Catocala cerogama, Guen.—Two taken for the first time, Aug. 18, 1906.

Catocala verecunda, Hulst.—Rare.

Catocala relicta, Walk.—The white form *bianca*, Hy. Edw., and a very dark form, almost, if not quite, as dark as the Pacific Coast form *elda*, Behr., have been fairly plentiful during the last few years.

Bomolocha lutalba, Sm.—About the middle of July, 1905, on the wing about cherry, saskatoon, etc., bushes, with *Chytolita petrealis*, etc.

Prionapteryx nebulifera, Stephen.—Aweme.

NEW HISTORIES AND SPECIES IN PAPAIPEMA (HYDRŒCIA).

BY HENRY BIRD, RYE, N. Y.

(Continued from Vol. XXXIX, page 317.)

It is rather remarkable that in penetrating the seclusion which has so thoroughly surrounded our *Papaipema* species until recently many new specific forms should be met with prior to the discovery of the early histories of some already described. In fact, it seems very much easier to go out and encounter something new and unheard of among their larvæ, than to run down in their early stages certain species already long known to us as moths. Of course, in territory as little worked as our great Northwest, with its diversity of elevation and humidity, this might easily occur, but to meet a species new to us in New York City limits that is general throughout the Atlantic States, and even occurs west of the Alleghany Mountains, and is actually a most common insect when we know where to put our finger on it, gives us a better conception of the habits of this secretive genus. So, when another new form first appears at Rye, where for many years a search of presumed diligence has continued, we are reminded how superficial were the endeavours and how little has been seen after all. Two years ago an enigmatic form was bred, and was carried for want of better definition under the label "(?) hybrid," but of what it might be a hybrid did not satisfactorily suggest itself. It soon appeared that there was no ground for considering so prevalent a form a random case of hybridism; its constancy and wide distribution argue against even an environmental variation that might be perpetuating itself. Neither is it suggested by any lapse of superficial character that some allied species wandering to a new food-plant has acquired a new habitus which we do not now recognize. Confronted by these facts, and finding its larva differing from the closest allies, we are able to give specific standing to still another departure in the *Papaipema* group.

Papaipema duplicatus, n. sp.—Form congeneric, front smooth. Ground colour dark brown. Antennæ simple in both sexes; vestiture of thorax and head one shade of grayish-brown with a lilac reflection, the collar having but the faintest paler edging above; the anterior thoracic tuft proportionate, but less adze-shaped than in some species; other tuftings normally present. Primaries have the markings obsolete, excepting the t. a. and the t. p. lines that divide the wing into three slightly contrasting areas, of which the median space is unduly contracted, and has on the inner margin of the wing less than one-third of this extent, an unusual feature. A slight powdering of glistening-gray scales occurs, but they are more minute and scattered in this species. No basal markings ; all inside the t. a. line is grayish-brown with the lilac tinting. The spots are wanting in the median field, which is of a solid brown or umber hue, excepting one specimen of the series, which shows the central, lunulate marking of the reniform, barely defined with grayish scales. The t. p. line is the more evident marking, and is straight or nearly so in its oblique course ; it is fasciate rather than geminate, accentuated outwardly by a grayish powdering that affects the whole terminal space ; the under colour is the same lilac-gray as the anterior space. The s. t. line is obsolete, or traceable only by a few glistening scales. Subterminal space darkens at the margin. The fringes are silken and slightly dentate. Secondaries pale smoky-brown. Beneath the usual powderings over a lighter ground colour. The structural characters of the male show no departure from the typical form. Expanse, 1.25 to 1.50 inches ; 32 to 37 mm.

Co-types are placed in the U. S. National and the British Museums. Seventeen examples, from various points within a four-hundred-mile radius, happen to be at hand for description, but the species is doubtless common throughout the geographical range of its food-plant. It comes closest, perhaps, to *nitela*, but its darker, browner tone easily separates it, and the very late date of flight is a noticeable feature.

The food-plant is *Collinsonia Canadensis*, and the young larvæ do not hatch from the hibernated eggs until the middle of June in this locality. The stem is entered a few inches above ground, where sufficiently tender, and a gallery is extended to the peculiar woody root-stock. But a limited cell is here made, though the last three stages are passed in the root proper, and pupation generally occurs there if the tissues are not broken. The young larvæ are typical with the *nitela* series. In the penultimate stage we find the typical, cylindrical larva, from which the previous darker colouring has faded to a soiled, whitish translucence, and having the continuous dorsal line in evidence. Head, 2.2 mm. wide ; chestnut-brown, darker than *nitela*, and with the side marking less distinct. The thoracic and anal plates are also darker, and the tubercles, though small, are better defined than in the ally. While the leg plates bear setæ, there seems an entire absence of the latter at any tubercle on joints two to ten, inclusive. The accessory plate IVa on joint ten does not appear. Length, 38 to 40 mm.

Maturity shows the larva a little more translucent, with the former characteristics continuing; setæ, however, are now found at the usual plates. It is possible the inflate of the preceding stage may have suffered in preparation, as the hairs ought normally to be present. Head, 2.6 mm. wide; tubercles defined by the merest black dots; IVa absent on joint ten; spiracles small, black. Length, 42 to 45 mm. Pupation occurs Aug. 15 to 21; emergence, Sept. 30 to Oct. 28.

By the difference in colour of the head one may readily separate this larva from either *nitela* or *eupatorii*, and differences of the dorsal line, or the tubercle IVa on joint ten, afford distinguishing features when comparing *necopina*, *imperturbata*, or *nelita*, while it is a month behind the last named species in final developments.

The active, shining, chestnut-brown pupa has no frontal development or other feature out of the ordinary. The anal spur consists of two divergent, slightly curved and very sharp branches. Length, 20 mm.

It has recently developed that one of our *Papaipema* moths is incorrectly determined, and permission has been granted to define this improperly-placed species. Material forwarded to the British Museum to assist a forthcoming volume of the Catalogue of Lepidoptera, contained examples of the presumed *limpida*, of Guenée. Sir Geo. Hampson informs us, however, that the determination is quite in error, that the type, which is there placed, positively represents some other species. This leaves the species we have been calling *limpida* without position, and as it is one which the writer observed in its early stages at Rye, permission for a further treatment affords great pleasure. It had been inferred from Grote's writings that *limpida* was very close to *cerussata*, so it was easy to get this erroneous impression concerning our Speedwell form. The very labour involved in locating and securing bred examples, together with its trim appearance and distinctive larval phases, has quite endeared the species to the writer. Also its rarity as a larva, the extremely local features of its occurrence, which is more a particular plant selection rather than a case of geographical distribution, and its late appearance as a moth, has surrounded the species with an individuality most welcome in a genus necessarily showing many commingling characteristics. During the seven years since the larva was discovered in one of the few wasteland spots that are left in Rye—and chance, by the way, has not thus far furnished it from other quarters—a continued local search has been made each year, and it is thoroughly known just what particular Speedwell root will give up a larva each year. So scarce are they, however, that four or five specimens per season is the best addition we can make to our series, and it now follows we must have a new name for the old friend.

Papaipema sciata, n. sp.—Ground colour very deep umber-brown, with a tinge of purple lake in fresh material. Head and thoracic vestiture of one deep purple-brown hue ; the abdomen is umber-brown, without the purple inflection. Antennæ alike in both sexes, ciliate, the upper and outer sides dark umber, the inner side distinctly white ; a small white scale at the base. The collar has the usual cream-white edging above ; the anterior thoracic tuft erect and spreading at the top ; the posterior one of the usual lesser prominence, its hair-like scales sloping backward at forty-five degrees ; dorsal crests of abdomen normal. Primaries have the costal margin very straight, the markings in some instances are obscure, the chief ornamentation being the cream-white stigmata. Basal spots and area not defined, all within the t. a. line of the purplish shading as the thorax ; the median field deep umber-brown, becoming brighter at the inner margin, where an illumination of red-brown scales often occurs. The median shade line faint, blackish. The t. p. line is geminate, sweeps outward from its costal inception to the lower end of reniform, continuing thence nearly straight to the inner margin. S. t. line appears as an irregular, darker illumination on the glistening purple ground of the terminal and subterminal spaces. Reniform of the normal broken appearance, cream-white. Orbicular and claviform same colour, the latter double, a commingling of two, superimposed, ovate spots ; the axis of this marking forming a more acute angle with the costa than is the case in most species. The usual patch of lighter ground colour at the apex is wanting in the series. Secondaries of a uniform smoky-umber hue, the veins showing darkly. There is some variation in the depth of this colouring. Beneath the wings are heavily powdered with dark scales, the fringes and mesial shade line darkly defined. The male structures, while typical, differ from *duplicatus* and *nitela* in having the lower point of the triangular tip of the harpes less drawn out and tooth-like. The clasper is the same stout, curved claw, with its outer edge minutely roughened like saw-teeth.

Expanse, 1.20 to 1.45 inches ; 30 to 36 mm.

Fourteen specimens, embracing both sexes, are at hand, and others have been reared. Examples bearing a co-type label will be placed in the U. S. National and British Museums, where the species is already represented by specimens from Rye, N. Y. It must have a wide distribution over the Middle Atlantic States, though Webster, N. H., is the only other locality positively recalled. *Sciata* resembles both *cerussata* and *frigida*, but its smaller size, darker tone and absence of white basal spots superficially separate it, while its larva is entirely different. For description of the latter, with notes of early history, consult this magazine (Can. Ent., Vol. XXXIII, p. 64). Correspondents will now bear in mind the change in the *limpida* label.

There seems reason for the introduction of two other species at this time, in view of forthcoming literature, so that our list may be as fully up to date as possible. One of these is a Pacific Coast form, the other an eastern one, which probably has a boreal tendency. While it might have been better to await a larval acquaintance, it is feared this desideratum may be too remote to be waited for.

Papaipema imperspicua, n. sp.—Form congeneric, front smooth. Ground colour yellowish-brown. Antennæ minutely ciliate, no white scales at base. Head and thorax purple-brown, the erect tuft spreading at the top, posterior tuft and the abdominal ones also normal. Basal spots indistinct, of the ground colour. T. a. line geminate, of the usual sinuous course, but its lower section bends outwardly and encloses more area than is usual; this area is an even, dull purple. The t. p. line is distinctly geminate and even in its course, the inner line a fine brown lunulate marking. It has an angled bend as it passes the reniform, rather than the broad sweep which is common to so many. The median field is yellowish-brown, the lower part yellower and brighter. The shade line is distinct and of a deep brown. The central marking of the reniform is all that appears, defined in a lighter hue of the ground colour. Orbicular and claviform wanting. The s. t. line is a fine lunulate yellow marking; at the costal tip there is outwardly a yellow dash. The terminal space is the even shade of purple which holds inside the t. a. line, the subterminal space is yellowish-brown again. Secondaries even smoky-brown. The male structures agree with the pattern of *nitela*, the outwardly dentate harpes with a prolonged lower lobe, and the heavy spinulated tip, follow the common design. Expanse, 1.50 in.; 37 mm.

The species in a way resembles *unimoda* and *frigida*, but the sexual characters preclude such an association. With *cerussata* there may be a closer bond, but the latter has been seen with concolorous stigmata, and this phase of its variation is understood. The type is from Mrs. A. T. Slosson, taken at Franconia, N. H., a locality renowned for the multitude and value of its disclosures. Buffalo, N. Y., is another locality for the species.

Papaipema limata, n. sp.—Form congeneric, front smooth, pattern conventional. Vestiture of head and thorax yellow, overlaid with pinkish scales; the tufts normal. Antennæ simple. Wings are a little narrow; ground colour bright lemon-yellow. The absence of powderings on the primaries makes them appear more thinly scaled than usual. Basal area defined and of the ground colour. T. a. line incomplete, in the lower half of its course lost entirely. The area it encloses is small and of the dull pink which replaces, in this case, the usual purple markings. The t. p. line is double, though the inner one is extremely fine; the outer is well shown, is the most noticeable of any transverse marking, curves outwardly past the reniform, from which it is well removed and defines a median field of good proportion, brightly coloured with the ground shade. The shade line is wanting, but a washing of the pinkish hue holds between the orbicular and reniform. The latter is broken, restricted in length, its axis is one-third less than that of the other combined spots and is pure white. The claviform and orbicular are large and brightly white, the former consisting of two confluent ovate spots, the latter a larger ovate spot. The terminal space is pink, the subterminal yellow, but there is no definite line dividing the two. The secondaries are paler yellowish and very silken. The beautiful silken fringes are a little pinker than the adjoining wing. Underneath of the same pale yellow, with pink powderings.

The type specimen comes to hand through the courtesy of Prof. J. B. Smith, and bears the locality label of the Washington Experiment Station, Pullman, Wash., date Sept. 25th, 1898, but the name of the collector is wanting. The species has no very close counterpart in the east, and approaches somewhat *insulidens*, which comes from Vancouver Island, but its lighter tone and markings sufficiently differentiate it. While the antennæ and abdomen are broken, the specimen is in good condition otherwise, and may well stand as the type to represent the species.

A FOSSIL LEAF-CUTTING BEE.

BY T. D. A. COCKERELL, UNIVERSITY OF COLORADO.

In the course of our excavations at Florissant, we had found more than once fossil leaves cut as though by *Megachile*. Yet we did not feel positive that the injury might not have been produced in some other manner, and it was certainly not permissible to assume the former presence of *Megachile* on such slender evidence. However, in going over the collections of 1907, I now find a veritable leaf-cutting bee, herewith described :

Megachile prædicta, n. sp.

♀.—Length (with the head thrust forward) 11 mm.; width of head 3, of thorax 4, of abdomen $3\frac{3}{5}$ mm.; abdomen oval, its length about 5 mm.; the dense ventral scopa can be clearly seen with the compound microscope, and the apical depressions of the segments are visible and quite normal. Head and thorax black, abdomen red. As preserved, the wings are also red, but this is due to a ferruginous infiltration. The abdomen is no doubt stained in the same way, but since it was evidently not black, it was presumably red, as in the Australian *M. abdominalis*, Smith. Head and thorax strongly and extremely closely punctured ; punctures on front considerably larger than those on mesothorax ; clypeus densely punctured ; inner orbits straight, somewhat converging below ; ocelli large, in a curve ; a groove runs downward from the middle ocellus. Anterior wing about 7 mm. long (the tip not visible) ; venation quite normal ; stigma large for a *Megachile;* marginal cell rather obtusely pointed, away from costa ; basal nervure ending a little behind (apicad of) transverso-medial ; second transverso-cubital with a double curve ; second recurrent nervure gently and evenly curved outwards, and ending a little before tip of second submarginal cell, the cell being rounded, not angulate, at its lower outer corner ; lower part of basal nervure quite strongly curved.

The following measurements are in micromillimeters :

Depth of stigma, 238 ; length of marginal cell, 2006 ; width of marginal, 510 ; length of first submarginal, 1343 ; of second submarginal, 1122 ; of first discoidal, 1921 ; basal nervure on first s. m. about 340 ; b. n. on first discoidal, 935 (or rather more, allowing for curve) ; b. n. short of t. m. about 68 ; length of first t. c., 340 ; origin of first t. c. to insertion of first r. n., 102 ; insertion of first r. n. to insertion of second, 986 ; insertion of second r. n. to corner of second s. m. about 68 ; insertion of second t. c. on marginal to apex of latter, 935 ; length of first r. n , 969 ; diameter of second discoidal cell at apex, 663 ; diameter of ocelli about 255 ; distance between middle and lateral ocelli about 170. The t. m. nervure is straight, scarcely oblique, 306 long.

Miocene shales of Florissant, Colorado, Station 14 (*W. P. Cockerell*, 1907).

This is the first fossil *Megachile*. A nameless *Chalicodoma* was said by Brischke (1886) to occur in Prussian amber.

MOSQUITO NOTES.—No. 6.

BY C. S. LUDLOW, M. SC., WASHINGTON, D. C.

Laboratory of the Office of the Surgeon-General, U. S. Army, Washington, D. C.

In a collection of mosquitoes from the Philippine Islands, received with no locality or date attached, is a most interesting lot of *Stegomyia fasciata (calopus)*.

In all cases the thoracic markings are those of the type, sometimes those of var. *mosquito*, Desv.; the leg markings are normal ; the cephalic markings vary from normal to an almost entirely pure white head, and the abdomen from the normal to a pure white (dorsal surface) abdomen. All grades of this latter peculiarity are present, some specimens having only additional apical bands on the segments, some showing a continuous median white stripe, some with all the segments but the 6th and 7th pure white, while a few have the whole of the dorsal aspect of the abdomen, pure white, with the exception of a small lateral brown spot on the last segment. In a collection of about forty specimens twenty-one showed some form of these variations. Once before I had one specimen of this specics with a white abdomen, and I have also reported one specimen with one hind leg normal and the other lacking the white bands, but a lot like this has never reached me before. There has also been received a new Cellia—a genus not before reported from the Philippines.

Cellia flava, n. sp.—Female. Head dark, covered mostly with light yellow or white forked scales, a few brown ones laterad and ventrad, a heavy bunch of very long, slender white curved scales projecting forward between the eyes, some brown bristles around the eyes ; antennæ almost white, a minute brown band at the base of each row of verticels, verticels and pubescence white ; palpi almost white, basal joint testaceous, the distal half covered with yellow and white scales, i.e., the apex with a broad band of white followed by a broad yellow band, a minute brown basal band on the ultimate and penultimate joints, the antepenultimate is distally white, then a broad yellow band occupying most of the joint, a narrow basal brown band, and the remainder of the palpi heavily scaled by brown with some intermixture of yellow scales. Proboscis light, base heavily brown scaled, then a mottled portion extending to the distal third, which is covered with light yellow scales, except a narrow brown band at its extremity, labella light orange ; clypeus testaceous ; eyes brown.

Thorax : prothoracic lobes testaceous, covered with light and brown flat spatulate scales ; mesonotum light and delicate, with two small submedian or laterad brown spots (not scaled) about one-third the length of the mesonotum from the head, sometimes another pair just cephalad-laterad to these, a suggestion of a brown median line, the whole (except spots) covered with white slender hair-like curved scales, a few small flat curved or spatulate scales scattered throughout, more noticeable laterad, especially cephalad of the wing joint, and at the nape growing into a tuft of long flat curved spatulate scales, a dark median spot in front of the scutellum ; scutellum dark in the middle, side light, brown bristles ; pleura light, with some brown lines ; metanotum light, with median brown stripe.

Abdomen light or dirty gray, sparsely covered with long flat spatulate white or yellow scales and white or light yellow bristles, heavy lateral tufts of long brown broadly truncate scales on most (6) of the segments, the last segment more heavily white scaled.

Legs : coxæ light, sparsely covered with long spatulate white scales, and white bristles ; trochanters light, mostly brown scaled ; femora of the fore legs somewhat thickened at the base, in all legs covered with irregular bands or spots of brown and white, and have a very narrow white apical band ; tibiæ mottled in the same way, first tarsal (metatarsi) joint also mottled, and has narrow apical light bands more marked on the hind legs ; remainder of tarsal joints on fore and mid legs more or less distinctly mottled and having narrow apical light bands ; on the hind legs the second tarsal has a broad apical white band, the third broad apical and basal white bands ; the fourth and fifth marked in the same way ; ungues simple and equal.

Wings light, and mostly light scaled, on the costa are two tiny basal dark spots, four large brown spots, and a tiny brown spot between the two more proximal larger spots ; all of which extend on the first long vein, and an analogous intermediate spot on the first long vein. Wing-field somewhat spotted, but mostly light scaled ; a dark spot on each fork of the second long vein, third long vein light except small spots at the apex and near its base, two small spots on the forks of the fourth, and a couple on the stem, three small spots on upper fork of fifth, one on the lower fork, stem light except that close to the base is a small dark spot, sixth has three small spots, and the wing fringe is spotted between the junctions of every vein.

Length 3.5 mm. 5 mm. with proboscis.

Male, much as female. On the antennæ the bands at the bases of the verticels are more yellow; the palpi are not so distinctly marked, there being a narrow brown band in the middle of the "club," a white band followed by yellow at the apex of the penultimate, with a brown spot on one side and a very narrow basal brown band, the antepenultimate has the light and dark bands rather irregularly placed and a tiny narrow white band at the base (in one specimen this is nude). The leg markings are perhaps more brilliant; fore ungues markedly unequal, the larger with a long tooth.

Habitat—Camp Wilhelm, Tayubar, P. I.

Taken Sept, 1907.

Described from four specimens collected by the Surgeon on duty at this Port. It is a very unusual looking Anophiline, and its colouring is very attractive.

A SUGGESTION REGARDING DEVELOPMENT RETARDED BY PARASITISM.

BY L. O. HOWARD, WASHINGTON, D. C.

In volume V. of the Hope Reports, Professor Poulton republishes an article by Mr. F. P. Dodd, entitled, "Notes on Some Remarkable Parasitic Insects from North Queensland," which was originally published in the Transactions of the Entomological Society of London, for May, 1906, Part I. In this article, among other interesting things, Mr. Dodd shows definitely that Schizaspidia and Rhipipallus of the Eucharidæ are true parasites of ants. But the observation to which I wish particularly to call attention is Mr. Poulton's comment upon Mr. Dodd's observations that indicate a remarkable and long-persistent vitality in larvæ attacked by Braconid parasites. Mr. Poulton says: "It is probable that within hot latitudes, where a dead insect would quickly dry up and in other ways deteriorate as food, the attacks of parasites have been specially adapted to prolong the victim's life to its very utmost. The adaptation, of course, always exists, but here we probably see it at its highest level."

This retardation is by no means confined to Braconid parasites, but also occurs with other parasites, and, as Mr. Poulton suggests, in other than hot latitudes. I recall very well some observations which Mr. Schwarz and I made on the larvæ of *Plusia brassicæ* in cabbage fields in Washington in 1881. It was in the autumn, and full-grown larvæ of this insect were rather abundant in the fields. Fifty or more specimens were taken to the laboratory, and showed an almost complete percentage of parasitism by *Copidosoma truncatellum.*

Some of the observations made at that time were recorded by me in the American Naturalist for February, 1882, pp. 150–1, and also in the Annual Report of the Department of Agriculture for 1883, p. 121. I believed then, and I think Mr. Schwarz concurred (although neither of us ever published the statement), that this practically complete percentage of parasitism was not necessarily indicative of the whole percentage for the season, but indicated that the parasitized larvæ remained longer in the field, and without ocular evidence of parasitism for a considerable time after the unparasitized individuals had spun up and transformed to chrysalids.

In fact, it frequently occurs with lepidopterous larvæ, and, of course, with other insects as well, that parasitized individuals grow more slowly than the rest, and often may be identified by their smaller size. Many, as we know, are destroyed before reaching full growth by certain parasites, but many others reach the full larval size and linger on, sluggish it may be, but apparantly unharmed for a considerable time after their unstung mates have crawled away and hidden themselves for transformation, or even perhaps, in case of multiple-brooded species, until individuals of a succeeding generation have approximated their stage of growth.

The practical feature of all this in work with parasites comes from the fact that we must take this retardation strictly into consideration in estimating percentages of parasitism. Should larvæ in considerable number be collected at the end of the season and kept for rearing purposes, it appears that through this retardation of parasitized individuals it may easily happen that an apparently almost complete percentage of parasitism will be observed which will by no means indicate the true percentage with the generation as a whole.

LAMPYRIDS AND APHIDS.

BY ERIC MONTIZAMBERT, PORT HOPE, ONT.

The great value of the Lampyridæ as destroyers of various insect nuisances in their larval stages is too well known to need comment, but I doubt if many persons are aware that at least one species of this sub-order has a particular relish for a certain aphid.

On June 8th, 1906, I was attracted by swarms of insects to a clump of Golden rod *(Solidago Canadensis)*; on drawing nearer I discovered that the insects were Lampyrids of a common species *(Telephorus carolinus)*. Hundreds were swarming over the plant, and this fact caused me to look more closely. Upon doing so I discovered that they were greedily devouring the big red aphids which were very common on Solidago about here. The beetle would seize the aphid from the rear with his mandibles and front feet, and in a few seconds would leave him sucked dry. The number of aphids destroyed in this manner was enormous. When I visited the plant the next day I saw nothing but hundreds of dried-up aphid skins; no beetles were visible. The aphid was *Siphonophora rudbeckiæ*.

A week later I noticed the same occurrence at a place eleven miles distant. The insects were identified for me by Dr. Fletcher, of Ottawa.

STHENOPIS THULE.

To the Editor of the "Canadian Entomologist":

SIR,—I cannot allow the note of censure appended by you to my paper on "Collecting Sthenopis Thule," in the December number, to pass unchallenged, as I feel that it is undeserved.

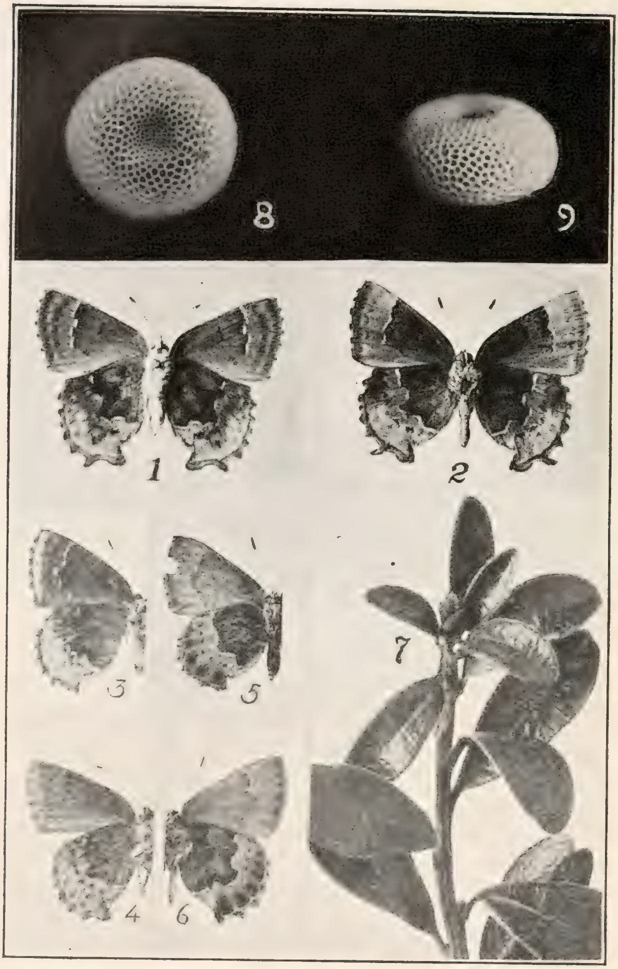
The former supposed great rarity of this moth was due to our ignorance of the food-plant, and, therefore, of the proper localities in which to look for it. As to its supposed restriction of range, it is inconceivable that a moth which feeds upon so common and generally distributed a tree as the willow, and which produces such an enormous number of eggs, could really be restricted to a very limited locality. Mr. Lyman found a specimen in the British Museum which had been received from Mr. Barnston, and was supposed to have been taken, along with other specimens, at St. Martin's Falls, on the Albany river. If it was really taken there, it shows a very wide distribution to the north, but even if that specimen was taken at Montreal, as has been privately suggested, there is still the statement of Dr. Strecker that he had received a drawing of one taken in Wisconsin, which would show a wide distribution to the west.

That it has not been taken to the south may indicate a northern range, and I believe that it will be found in a northerly and north-westerly direction, if looked for in its season where willow scrub abounds. It should also be remembered that as its season is so short, it probably mates immediately, and oviposits very early.

It should also be remembered, as Dr. Knaggs points out in his "Guide," that a moth which flies in the dusk of the evening will also, under favourable circumstances, fly in the dusk of the dawn, when it will be free from molestation by even the most greedy collector.

200 Mitcheson St., Montreal, Dec. 24th, 1907. EDWARD DENNY.

Mailed January 8th, 1908.



INCISALIA POLIOS—EGGS AND ALLIES.

The Canadian Entomologist.

VOL. XL. LONDON, FEBRUARY, 1908. NO. 2.

STUDIES IN THE GENUS INCISALIA.

BY JOHN H. COOK, ALBANY, N. Y.

V.—INCISALIA POLIOS.

Described in THE CANADIAN ENTOMOLOGIST, Vol. XXXIX, No. 6, p. 204.

When this species was named in June, 1907, the final snarl of a nomenclatorial tangle of thirty years' standing was resolved into its constituent threads. *Incisalia polios* is not a rare butterfly discovered by the fortuitous capture of a few local specimens; it is common in many places near centres of entomological activity. Nor is it an obscure form, to be separated from its congeners only after painstaking study; it is marked in a very characteristic manner, and is easily identified. In fact, it has been mentioned in the literature several times either as a recognizable variety or as a distinct species, but has always masqueraded under an assumed name.

Strecker's misidentification.—In his Catalogue of Butterflies (1878), Herman Strecker listed the *Henrici* of Grote and Robinson as a variety of *irus*, Godart, characterizing it as "smaller" and with the "inferiors tailless." As I have already pointed out,[1] this characterization is erroneous, and does not apply to *Henrici*. It *does*, however, apply to *polios;* and that Strecker had an (at that time) undescribed species before him, which he misidentified as *Henrici*, is proved by specimens of *polios* in his collection labelled *Henrici*. Evidently Strecker had never seen the type of Grote and Robinson's species (which is hardly to be wondered at in view of the strained relations existing between him and Grote), and how he came to make the error is not apparent. But that others have relied upon the accuracy of his determination, and thereby given life to the mistake, cannot be doubted.

W. H. Edwards bred *Henrici*, and expressed his conviction that it was a good species in 1881 (Papilio, I, p. 152). He placed it as such in his catalogue of 1884, although in his earlier catalogue (1877) it had been given as a variety of *irus*. Fernald, C. H., in "The Butterflies of Maine" (1884), followed Edwards in separating *Henrici* specifically from

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[1] CANADIAN ENTOMOLOGIST, Vol. XXXIX, No. 6 (June, 1907), p. 182.

irus, and appended Edwards' description of the early stages of *Henrici* to the description of a butterfly which *is not Henrici, but polios.* In distinguishing between *polios* and *irus*, it is quite clear that Fernald was misled by Strecker's misidentification into believing that what he called *Henrici* (really *polios*) was the species bred by Mr. Edwards, and the form described by Grote and Robinson.

Following Fernald, both French, G. H.,[2] and Maynard, C. J.,[3] give, under the name *Henrici*, a brief diagnosis] of *polios*, contrasting it with *irus*.

One other reference deserves attention in this connection, showing how the true *Henrici* has been lost sight of in the maze of literary error. In the "Butterflies of New Hampshire" (Technical Bull. No. 1, N. H. Coll. Agr. Exp. Sta., Durham, 1901), Fiske, W. F., gives *Henrici* as a synonym of *irus* in the caption of species No. 43, p. 45, and then (under *irus*) discusses *polios*, as may be inferred from the statement that he has taken the species as early as April 19th; or possibly he refers to *polios* and *irus* regarded as one species. In the second paragraph he writes of a very remarkable variety (of *irus*) having tails. This is illustrated, and though the figure is not particularly clear, anyone acquainted with the species will have no difficulty in identifying it as *Henrici* of Grote and Robinson. That Fiske identified *polios* (*i.e.*, the *Henrici* of Strecker, Fernald, *et al.*) as Grote and Robinson's *Henrici*, appears probable from the first sentence under species No. 44 (p. 46), where he says: "*Augustus* is between *Henrici* and *niphon* in point of emergence." Evidently something was taken for *Henrici*, and since it was not the real *Henrici*, it must have been either *irus* or *polios;* and the early emergence points indubitably to the latter.

I find *Henrici* properly identified in the Hill, Bailey and Corning collections in this city (though all specimens are labelled ♀ regardless of their real sex, probably because no stigma is present in the ♂), but there is a specimen in the collection of the late J. A. Lintner (now the property of the State of New York) labeled "*T. irus*, var. *Henrici* (New Hampshire)," which is a ♂ *polios.* I mention this for two reasons: first, because it shows that some, at least, of the elder generation of lepidopterists were led astray by Strecker's blunder; and second, because formerly, while making slow progress through the meagre and much-mixed literature toward an understanding of the *irus-Henrici* difficulty, I spoke of this specimen as "an undoubted ♂ *irus*."[4] The reasons for my error at that time are, I think, obvious.

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[2] The Butterflies of the Eastern U. S. (1886), p. 273.

[3] A Manual of North American Butterflies (1891), p. 144.

The *Henrici* of Grote and Robinson is figured, as stated, in the Butterflies of New Hampshire (fig., p. 45, under surface of ♀?) and also in Holland's Butterfly Book (plate XXX, fig. 21, upper surface of ♀).

Wright's misidentification.—If one may judge from the rather poorly-marked specimen figured by Wright as *Mossi*, the species represented is *polios*.[5] At any rate, it is *not* the *Mossi* of Hy. Edwards. The type *Mossi* is now in the Museum of Natural History in New York City, and the species for which it stands has never been figured hitherto. In the original description[6] drawn from that type Edwards says of the under side of the secondaries: "*The marginal spots are large, distinct, bright chestnut-brown, six in number*, each surmounted by a small black lunule." And concerning the mesial line (secondaries beneath) it is "narrow, whitish, *with a very large and sharp angle at the median nerve*." Also concerning the white line crossing the primaries beneath: "From the costa entirely across the wing is a sinuous white band *bent outwardly at the middle*, and edged above by a deep chestnut-brown shade." The wings above are described as "*entirely bright chestnut-brown*, a little clouded, with dusky at the apices and on the extreme margins." It is further stated that the fringes are "wholly white," but this is not strictly the case even in the type.

How far these characters may be regarded as of specific importance remains to be determined, but Wright's illustration is a long way from corresponding in essentials with the type or fitting the description.

Edwards described *Mossi* as a variety of *irus*, adding that "it is quite possible that it is a distinct species; *the uniform deep brown base of secondaries* giving it a most peculiar appearance." Wright says in the text accompanying his figure: "The essential peculiarity of *Mossi* is the *bleached, washed-out appearance of the under side of hind wings*, 'giving it a most peculiar appearance,' as the description truly says." (My italicization throughout.) As a matter of fact, a fresh specimen of *Mossi* is as boldly and cleanly marked as any species of *Incisalia* yet named. I am of the opinion that the species figured by Wright is *polios*.

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[4] CANADIAN ENTOMOLOGIST, Vol. XXXVII, No. 6 (June, 1905), p. 218.

[5] Wright, W. G., Butterflies of the West Coast, plate XXVIII, fig. 331.

[6] Edwards, Henry, Papilio I, p. 54 (April, 1881).

Illustrations.—Better than the best description is a good illustration, and it therefore seems well to picture the four species which have been confused. Fig. 1 in the plate represents *irus*, as that species is ordinarily recognized. Godart's original description is too vague and unsatisfactory to enable anyone to identify *irus* with certainty. That author himself was not sure that his type (as it would be called to-day) came from America. We rely on Dr. Boisduval, who says that he saw Godart's specimen, and that it represents the species figured by Abbot (in the Histoire Génerale et Iconographie des Lepidopterès et des Chenilles de l'Amérique Septentrionale, 1833). Abbott's figures are not exceptionally good, but the species intended is undoubtedly the one which has subsequently been known by Godart's name. The specimen here figured was bred from the egg, at Albany, N. Y. It is a ♀. The species is illustrated in colours in Scudder's "Butterflies of the Eastern U. S. and Canada," Holland's "Butterfly Book" and Comstock's "How to Know the Butterflies."

Fig. 2 is the *Henrici* of Grote and Robinson from a homotype bred from the egg at Albany, N. Y. It also is a ♀.

Fig. 3 is a ♀ and fig. 4 a ♂ *polios* (the miscalled *Henrici* of Strecker and others).

Fig. 5 is a ♀ homotype of *Mossi* collected in Colorado. Though imperfect, the specimen corresponds to the type specimen more closely than any other individual of the species which I have seen. The "very large and sharp angle at the median nerve" is about as in the type, and it is hoped that this illustration will illumine Hy. Edwards' description. The large, chestnut-brown spots occupying the interspaces of the secondaries from the margin inward nearly to the "black lunules," effect a photographic plate but little, and therefore appear almost black in the print. Specimen in the collection of the author.

Fig. 6 is a ♂ *Mossi* (from the collection of Jacob Doll), exhibiting the greatest departure from the typical design which I have seen. The varietal differences can be seen at a glance, and need not be discussed here.

All figures represent the under surface × 1.25.

Distribution.—*Polios* is distributed widely over the continent. Along the Atlantic Coast it is found at Lakewood, N. J. (Watson, Sunderland, Cook); Lakehurst, N. J. (Davis, Watson, Brehme, Cook); Jamesburg, N. J. (Watson, one specimen); Medford, Mass. (John Rodgers): Milton, Mass. (H. H. Newcomb) ; Durham. N. H.* ; Norway, Me.*; Orono, Me. (M. E. Fernald, in coll. Cornell University) ; and Digby, Nova Scotia (John Russell). From its occurrence at Medford and Milton, the Massachusetts localities (Needham and Walpole), given by Scudder in the Butterflies of the Eastern U. S. and Canada, for the varietal form of *irus* having " the outer margin of the primaries . . . . narrowly hoary," may be safely included as referring to this species.

In the Butterflies of Maine, C. H. Fernald says : " This is a common species in Maine," and Fiske speaks of it as abundant in certain parts of New Hampshire.

Polios was taken in 1907 by Mr. Charles A. Hill, of Chicago, at Pine, Ind., in the sand-dune region along the southern shore of Lake Michigan, where *Synchloe olympia* was recently unearthed. Mr. Hill took fourteen specimens, and reports the species fairly abundant in that locality.

In the west *polios* has been taken at the " head of Pine Creek, Calgary, Alberta (F. H. Wolley Dod)" ; forty miles south of Athabasca Landing, Athabasca[7] (McCary) ; Waghorn, Alberta (P. B. Gregson, in the collections of John Comstock, Evanston, Ill., and Alexander Kwiat, Chicago, Ill.). Dr. Henry Skinner[8] gives as another Canadian locality, Olds, Alberta. Also in Colorado (Morrison, in collection of O. Meske, and David Bruce, in collection of Cornell University) ; Graham's Park on Rio de los Pinos, Colo.*[9] ; South Park, Colo.*; and Chimney Gulch, near Golden, Colo. (Dyar and Caudell).

Without much hesitation I include Puget Sound (Wright), the locality given for the specimen figured in Butterflies of the West Coast *(l.c.)*.

Time of Flight.—Species single-brooded, the butterflies appearing (in New Jersey) with *augustus* about the middle of April, ordinarily becoming abundant before the last of the month, and rarely enduring through May (Watson). In New Hampshire " earlier in its emergence than any of the allied species ; . . . . taken on willow blossoms in Durham as early as April 19th " (Fiske).[10] In Maine it " is on the wing during the middle of May " (Fernald). Fresh specimens from Nova Scotia are labelled from May 15th to 22nd. The few available records from Massachusetts indicate that the species appears there as early as April 25th, and does not fly into June ; specimens dated later than May 12th are pretty well worn.

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*Collector unknown.

[7] So reads the label, though the only Athabasca Landing which I have found on the map is in Alberta.

[8] Entomological News, Vol. XVIII, No. 8 (October, 1907), p. 327.

*Collector unknown.

[9] Misprinted " Cal." in the original description of *polios*.

[10] Probably careful field work will show that *augustus* is on the wing almost or quite as early.

Records from the west show that between the 37th and 56th parallels the imagoes are on the wing during May, twenty degrees of latitude affecting the season of emergence but little, if any. Colorado specimens are labeled as early as April 17th, and faded individuals from Graham's Park and Golden, Colo., were taken May 11th, 12th and 13th. Wright's specimen, taken May 1st at Puget Sound, seems to be somewhat the worse for wear. A ♂ and a ♀ in the U. S. National Museum, collected by Wolley Dod at Calgary, are dated June 29th, and are in very good condition, though not perfectly fresh. However, another ♀ from the same locality was captured May 29th, the individual taken by McCary some 200 miles further north is labeled May 14th, and the specimens received from Waghorn, Alberta, were captured May 3rd and 5th. Mr. Hill secured his butterflies not far from Chicago, on the 19th of May, and all but one bear evidence of having been on the wing for some time.

Haunts and Habits.—In New Jersey the butterflies inhabit the low sandy coastal plain in restricted districts where the larval food-plant occurs, and are to be looked for in sunny spots along the roads and in sheltered glades among the scattered pine growth. They ordinarily fly low, rapidly and for short distances, and delight to feed on the nectar of the early spring flowers, especially the pyxie and (later) the strawberry flowers. They are quite local, ranging over a very restricted field between emergence and death ; one may observe them in numbers at one point throughout the day, and yet a few rods away might wait in vain to see one pass.

Mr. Hill took his flitting about in the open over the hot, barren sands, and Dr. Dyar found them in Colorado along a railroad track in the jaws of the gulch, at an elevation of about 7000 feet.

Oviposition.—The females apparently do not oviposit much before the middle of May, but during the latter half of the month eggs may be found without difficulty. These are laid singly at the base of the elongate leaf-buds (rarely on flower pedicels), as shown on fig. 7 on the plate.

The illustration is from a photograph (× 2) of the spray upon which a confined female placed four eggs on May 18th, 1907. Three of these are visible. In nature they would have been laid on separate buds. As may be seen from the picture, the petioles of the old leaves parallel the stem for a little distance before the blade curves outward. Near the tip of the branch, where the internodes are short, the petioles surround and protect the base of the apical bud, and it is into this protected zone that the female usually thrusts her ovipositor when laying an egg.

The Egg.—Echinoid, flattened on top and bottom, micropyle strongly depressed. Ornamentation a reticulation of extremely high raised lines, broad and losing character by anastomosis at intersections. Interspaces small, deeply sunken, appearing like nearly circular pits. The ornamentation resembles that of the egg of *Chrysophanus thoe* or *Epidemia epixanthe* more than those of more nearly related species which I have seen (except that of *Incisalia Mossi*, from which it is practically indistinguishable), and may be identified at once by the absence of bosses and the "pin-hole" interspaces. Fig. 8 micropylar aspect, fig. 9 equatorial aspect. Both × 35.

(To be continued.)

A NEW SPECIES OF SYNTOMASPIS (CHALCIDOIDEA).

BY CYRUS R. CROSBY, CORNELL UNIVERSITY, ITHACA, N. Y.

Syntomaspis thalassinus, n. sp. (Figs. 2, 3 and 4).—Female.—Length, excluding the ovipositor, 2.6 mm.; abdomen, 1.2 mm.; ovipositor, 1 mm.

Head transverse, abruptly convergent behind the eyes, seen from in front rounded triangular, greenish-bronze, sculpture of head a fine and delicate ridging, which gives a very fine reticulation; face with a few larger

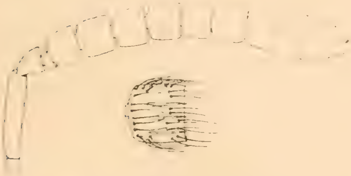


FIG. 2.—Antenna of male.

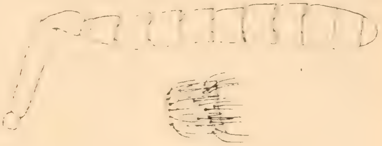


FIG. 3.—Antenna of female.

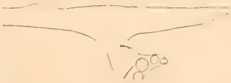


FIG. 4.—Stigmal region of wing.

punctures, margin of clypeus smooth, convex. Mandibles tridentate, lower tooth rounded.

Thoracic dorsum finely reticulate, bluish-green, metallic, parapsidal furrows impressed, the median portion of the mesonotum extending further back than the lateral piece, and broadly rounded behind, scutellum rounded in front, widely separating the axillæ, margined and evenly rounded behind, the transverse stria distinct; axillæ prominent, acute mesally and rounded in front. Thoracic pleura delicately sculptured except metepisternum and the sclerites behind it. Propodium short, transverse, nearly smooth, very finely rugulose longitudinally. Spiracles oblique, elliptical.

Scape and pedicel of antennæ metallic, scape finely shingled, funicle dark brown, clothed with short but stout hairs, scape rather short, slender, pedicel obconic, about as long as first joint of funicle, succeeding joints subequal, gradually wider, club obtusely rounded, white longitudinal ridges on funicle joints, with their bases in one row, and all extend to tip of segment.

Legs metallic-green; knees, tip of tibiæ and tarsi dull, whitish-yellow, last tarsal joint somewhat dusky; posterior coxæ irregularly reticulate. Wings hyaline, stigmal vein shorter than diameter of club, the four sensoria arranged in a curved line, concave behind.

Abdomen seen from above conic-oval, bluish-green, metallic, second dorsal segment smooth, posterior segments with a hexagonal pavement-like sculpture, posterior margin biconvex, very deeply incised at middle, segment 5 longer than 3 and 4 together, posterior margin of 3 deeply incised, 4 and 5 less deeply, 6 truncate behind. Cerci bearing several long, stiff hairs. Ovipositor dark brown, tip lighter.

Male.—Length, 1.2 mm.; abdomen, .8 mm. Resembles the female very closely in colour. The antennæ are somewhat stouter. Posterior margin of abdominal segments not so deeply incised as in female.

Described from numerous specimens reared from timothy grass and orchard grass. Parasitic on an Isosoma and another Chalcid as yet undetermined.

Ithaca, Amsterdam, Lake Keuka, Oneonta, Kingston, Cranberry Creek, Remsen, Elmira, Lowville, Bluff Point, Cortland, and Victor, N. Y. Types in Cornell University collection.

SOME NEW NEMATID SAWFLIES FROM COLORADO.

BY S. A. ROHWER, BOULDER, COLORADO.

The following descriptions are based principally on material collected by myself during the past summer. One new species is described from the collection of the Colorado Agricultural College ; the rest are in my own collection.

Many thanks are due to Professor T. D. A. Cockerell for going over all the descriptions. The work is a contribution from the laboratory of Systematic Zoology in the University of Colorado. I am greatly indebted to Professor C. P. Gillette for the loan of the collections belonging to the Colorado Agricultural College.

The following descriptions of *Pontania* galls seen at Florissant, Colorado, may be of some use. On *Salix brachycarpa*, Nutt. : (1) Monothalamous ; springing from lower side of leaf ; arranged along the midrib ; globular ; colour pale pinkish ; measurements before maturity 8 mm. (2) Monothalamous ; bisecting leaf ; attached near petiole in clusters of two to four ; bright rose colour above, pinkish below ; measurements before maturity, 10–12 mm.; similar to *P. resinicola*, Marl. Another *Potania* gall on *Salix* sp., is much like *P. Bruneri*, Marl, but did not bisect the leaf, and was attached along the midrib; only one monothalamous gall on each leaf. The *Salix* belongs to *Longifoliæ* as defined by Dr. Rydberg in his Flora of Colorado (Bul. 100 Colo. Agricultural College) and probably is *S. exigua.*

Pontania leucostoma, n. sp.—♂. Length, 5 mm. Moderately robust; head nearly as wide as thorax ; clypeus shallowly, circularly emarginate, lobes broad, rounded ; ocellar basin distinct, walls rounded ; antennal fovea broad, shallow, elongate ; antennæ extending beyond thorax, third and fourth joints equal, fifth shorter ; joints somewhat nodose at tips ; vertex back of ocelli with a few well-defined punctures ; mesothorax above with a few small, more indistinct punctures. Venation of primaries normal ; secondaries with the lower discal cell longer and wider than upper, claws deeply notched, inner ray shorter and somewhat slender.

Colour in general shining black; face below antennæ, except two black spots below antennæ, clypeus, labrum, mandibles, except tips which are piceous, posterior angles of pronotum, tegulæ, base of costa, apex of anterior coxæ whitish ; posterior orbits, upper orbits, inner orbits narrowly, apex of four hind coxæ, trochanters (coxæ and trochanters are inclined to pallid), meso-femora except a narrow line above, meso-tibiæ, meta-femora except a broad line above and below, meta-tibiæ except at apex, venter near apex, and edges of the hypopygium ferrugino-testaceous ; meso-tarsi and palpi brown ; hind tarsi black. Wings dusky hyaline ; costa, except at base which is white, and stigma yellow-brown ; rest of the nervures brown.

Habitat.—Boulder, Colo., May 22, 1907 (S. A. Rohwer), on foliage of *Populus angustifolia.*

In Marlatt's Revision of the Nematinæ (Tech. Ser. No. 3, U. S. Dept. Ag.) this species runs to *P. pisum*, Walsh, but it is not that, and may be separated from it by the short fifth antennal joint, different shape of the clypeus, not having the third cubital quadrate, the black antennæ, black line on femora above, yellowish-brown stigma, etc. It also seems to be related to *P. glinka*, Kincaid, but may be separated from that species by the unequal tarsal claws, the lower margin of the stigma being rounded, etc.

Pontania brachycarpæ, n. sp.— ♀. Length, 4½ mm. Head almost as wide as thorax ; seen from above broadly rectangular ; clypeus angularly emarginate, lobes triangular, ocellar basin shallow, the walls broad and rounded ; ocellar basin with small, dense punctures ; antennal fovea distinct ; antennæ stout, extending about to basal plates, fourth and fifth joints equal, third longer ; frontal crest slightly emarginate. Third cubital cell sub-quadrate ; upper discal cell of hind wings slightly exceeding the lower ; claws deeply notched, the inner ray shorter and somewhat stouter ; sheath with long brownish hairs. Colour in general black; clypeus, labrum, mandibles, except tips which are piceous, cheeks, face, somewhat between the antennæ, upper and posterior orbits broadly, inner orbits narrowly, extreme angle of pronotum, tegulæ, coxæ except base, trochanters, femora, tibiæ and tarsi, extreme tip of last dorsal segment, last ventral segment slightly, pale reddish yellow, coxæ and trochanters inclined to pallid; palpi brown ; tarsi (especially the posterior ones) and apex of posterior tibiæ infuscate. Wings hyaline ; nervures dark brown, costa white at base.

Habitat.—Florissant, Colo., June 16, 1907 (S. A. Rohwer) on foliage of *Salix brachycarpa.*

This species is closely related to *P. pisum*, Walsh, but may be separated by the following characters: Head not so wide as thorax, upper discal cell slightly exceeding the lower, claws with inner ray shorter and stouter ; pronotum mostly black. It is also somewhat related to *P. consors*, Marl. (CAN. ENT., Dec., 1898), and may be known from it by the subquadrate third cubital, black sheath and venter and the apical half of the abdomen being black. It also has much general resemblance to *P. leucostoma*,

n. sp., but is smaller, the wings less dusky, the nervures weaker; and upper discal cell of hind wings extends beyond the lower, whereas the lower beyond the upper in *P. leucostoma*.

Pontania megacephala, n. sp.—♂. Length, 4 mm. Head wider than thorax; transversely oval; inner orbits parallel; clypeus rather deeply and angularly emarginate, lobes broad, rounded; vertex flat, slightly raised back of ocellar basin shallow, walls rounded; antennal fovea small, round, but distinctly defined; antennæ a little shorter than body, third, fourth and fifth joints equal; last seven joints with dense, short black hairs. Venation normal, except that the third cubital is rather small, claws minutely but evenly cleft.

Colour in general, black; clypeus, labrum, mandibles, except tips which are piceous, cheeks, extreme posterior angles of pronotum, tegulæ, apex of coxæ, white; small indistinct spot on upper orbits, posterior orbits on one side very narrowly, trochanters, femora, except line above on meso- and meta-, and line below on pro-femora (the line on the meta-femora is broad), tibiæ, apex of venter and hypopygium pale reddish-yellow; tarsi (the anterior tarsi are much the same as the tibiæ) brownish; palpi brown. Wings hyaline; nervures brown, costa white at base, stigma pallid at base.

Habitat.—Florissant, Colo., June 16, 1907 (S. A. Rohwer), on foliage of *Salix brachycarpa*.

This species is related to *P. agilis*, Cr., but may be separated by the flatter vertex, broader lobes of the clypeus, claws somewhat deeper cleft and much darker colour. *P. agilis* in general is yellow-ferruginous.

Pontania maura, n. sp.—♀. Length, 4 mm. Robust. Head much narrower than thorax, small and almost round when seen from the front; clypeus nearly truncate; ocellar basin with wall rounded: antennal fovea small, round, distinctly defined; antennæ as long as head and thorax, fourth and fifth joints equal, third shorter and about equal in length with sixth; vertex rounded; head finely and densely punctured; mesothorax above finely, but not as densely as head, punctured. Venation normal, claws deeply cleft, rays subequal and somewhat diverging.

Colour black, except apex of femora, tibiæ and tarsi, which are pale testaceous; tarsi, especially the hind ones, infuscate, hind tibiæ somewhat infuscate; ovipositor luteous. Wings very hyaline; nervures brown, costa, stigma and all the nervures at base of wing pallid, almost hyaline.

Habitat.—Florissant, Colo., June 1, 1907 (S. A. Rohwer), on foliage of *Salix brachycarpa*.

This species is related to *P. atra*, Marl., but may be separated from it by the light nervures of the wings, dark trochanters, claws deeply notched, etc. It is also more robust. It is also related to *P. unga*, Kincaid, but may be separated by the nearly truncate clypeus, the tarsal claws being subequal and diverging, smaller size, light stigma and costa, and veins being paler, etc.

Pontania melanosoma, n. sp.— ♀. Length, 3½ mm. Robust; clypeus circularly emarginate, lobes broadly rounded, antennal fovea distinct, circular; ocellar basin indistinctly defined; ocellar regions raised; from lower ocellus running to top of each eye is a broad, shallow furrow; antennæ extending to base of abdomen, third and fifth joints equal, fourth a little longer, head and mesosternum finely and rather densely punctured. Third cubital cell subquadrate, slightly wider at apex than at base; upper discal cell of hind wings slightly exceeding lower. Claws deeply notched, rays subequal. Sheath broad, slightly emarginate beneath, acuminate at tip; cerci robust, tapering.

Colour mostly black; clypeus, labrum, mandibles, spot between antennæ, antennæ beneath, except scape, dark brown; a triangular spot on upper orbit fulvous; posterior angles of pronotum, tegulæ, legs, except bases of coxæ and tip of posterior tibiæ and their tarsi, which are infuscate, reddish-yellow. Wings dusky hyaline, nervures brown, base of stigma and all the nervures as they near the base of wing, white. Clypeus with a few long white hairs.

Habitat.—Fort Collins, Colo., May 13, 1899. Type in the collection of Colorado Agricultural College.

In Marlatt's Revision of the Nematinæ of N. Am., this species runs to *P. nigrita*, Marl., but is easily known from that species by the circular antennal fovea and the black posterior orbits.

Pteronus hypomelas, n. sp.— ♀. Length, 5 mm. Clypeus broadly, shallowly, circularly emarginate, lobes small; antennal fovea not distinctly defined; ocellar basin with walls rounded; between the ocellar basin and the eye is a rather large impression; frontal crest broken in the middle; antennæ reaching to about the third abdominal segment, third, fourth and fifth joints subequal; head with rather sparse, small punctures; pleura sericeous, claws deeply notched, inner ray somewhat shorter than outer. Third cubital cell twice or nearly twice as wide at apex as at base, two and a half or three times as long as width at base; outer veins of discal cell of hind wings meeting or upper cell slightly extending beyond lower, lower discal one and a half times as wide as upper; stigma regularly tapering from near base to apex.

Colour black ; lobes of clypeus, labrum, mandibles, tegulæ, legs from middle of femora, last apical segment of abdomen, reddish-ferruginous ; trochanters pallid ; palpi brown ; upper orbits dark reddish. Wings hyaline ; nervures light brown, costa at base and the entire stigma pallid.

Habitat.—Florissant, Colo., June 1, 1907 (S. A. Rohwer), on foliage of *Salix brachycarpa.*

In Marlatt's Revision of the Nematinæ of N. Am., this species runs out because of the black venter, but it seems to be related to *P. atriceps*, Marl., and may be separated from it by the black venter, smaller size, the fovea not deep, etc.

Pteronus notatus, n. sp.—♀. Length, 5½ mm. Clypeus angularly emarginate, lobes round, antennal fovea deep, narrow, elongate ; ocellar basin with walls round ; frontal crest broken in the middle ; antennæ slender, reaching about to third abdominal segment, joints three, four and five subequal, the third a little curved ; sheath broad, obtusely pointed, without any hairs at apex. Claws deeply cleft, inner ray a little shorter than outer. The third cubital cell one and a half times as wide at apex as at base, a little more than twice as long as wide at base ; upper discal cell in hind wings extending considerably beyond lower ; stigma straight on lower margin until apical third, where it slants abruptly upward.

Colour black, clypeus, labrum, base of mandibles (the tips are piceous), coxæ, except at base of posterior ones, trochanters, posterior angles of pronotum and tegulæ whitish ; upper posterior and superior orbits broadly, legs from trochanters, except a thin black line above and below on posterior femora, apical segment of abdomen and sheath somewhat, ferruginous ; palpi brown. Wings dusky hyaline ; nervures brown, costa and stigma pallid.

Habitat.—Florissant, Colo., June 23, 1907 (S. A. Rohwer), on foliage of *Salix brachycarpa.*

In Marlatt's Revision of the Nematinæ of N. Am., this species runs out on account of the black venter, but it seems to be near *P. Coloradensis*, Marl, from which it may be separated by the black venter, antennal fovea *not* being triangular, etc. It is, however, closely related to *P. hypomelas*, n. sp., but may easily be separated by the following comparison. Other characters also separate these two species :

P. hypomelas.

1. Clypeus broadly, shallowly emarginate, lobes small.
2. Eyes almost round on upper margin.

3. Stigma tapering from near base to apex.

4. Upper discal cell of hind wings but slightly, if any, exceeding lower.

5. Posterior angles of pronotum black.

P. notatus.

1. Clypeus angularly emarginate, lobes round.

2. Eyes oval on upper margin.

3. Stigma straight until apical third, when it slants abruptly upwards.

4. Upper discal cell of hind wings extending considerably beyond lower.

5. Posterior angles of pronotum and tegulæ whitish.

MOSQUITO NOTES.—No. 6.

BY C. S. LUDLOW, M. SC.

Laboratory of the Office of the Surgeon-General, U. S. Army, Washington, D. C.

(Continued from page 34.)

In the same sub-family as *Cellia flava* comes an insect closely related to *Chagasia*, Cruz., having the outstanding whorls of scales on the lower joints of the antennæ, but lacking the outstanding scales on the thorax, and differing also in that part of the abdomen is scaled.

Chagasia (?) *lineata*, n. sp.—Head very dark, practically black, as is most of the insect, covered with dark brown and white-forked scales, the latter on the vertex and cephalad part of the occiput, very long slender white scales projecting forward between the eyes, dark bristles near the eyes; antennæ very dark, verticels and pubescence white, basal joint brown, with white upright flat scales, 1st and 2nd joints with white scales, those on the second joint longer, more curved, largely fusiform and outstanding, those on the first joint narrow, flat and more closely appressed; palpi heavily covered with dark brown scales, rather erect near the base, the apex white, and two narrow white bands dividing the remainder into three nearly equal parts; proboscis heavily covered with dark brown scales, tip light; eyes dark, clypeus dark.

Thorax: prothoracic lobes with broad fusiform white scales and dark bristles; mesonotum covered sparsely with broad fusiform white scales arranged in lines, near the nape a few slender curved white scales, most of which project forward, a distinct line of the broad fusiform scales cephalad of and over the wing joint, not especially outstanding, but the scales broader than most of those on the mesonotum, a few scales near the middle of the mesonotum are either discoloured slightly or normally yellowish, two long oblong, bare, black, laterad spaces about one-third the length of the mesonotum extend cephalad from near the scutellum; scutellum black, partly denuded, but with a heavy bunch of flat, rather fusiform, white scales on the lateral lobes, bristles black; pleura black, with gray lines; metonotum very dark.

Abdomen black, densely covered with brown hairs, and the eighth segment and genitalia rather closely covered with long flat more or less spatulate brown scales.

Legs: coxæ and trochanters testaceous with dark hairs and white scales; all the femora covered with dark brown scales, the hind and mid legs with a white subapical spot on the cephalic aspect, and all of them with apex very narrowly white-banded; tibiæ all brown, with small apical spot or band; first tarsal joints all brown, in the hind leg with small apical white spot extending slightly on the second joint, in the fore and mid with narrow apical white bands; second tarsal brown, with broad white apical bands, broadened on the hind leg, in which all the remaining joints are pure white, and in the other legs the third and fourth are apically white-banded, the fore leg the more distinctly, the fifth brown; ungues large, simple and equal.

Wing clear, covered heavily with dark brown scales resembling those found in Myzorhynchus; costa with four small white spots, all apparently confined to the costa, and one at the apex; a white fringe spot at the junction of the upper fork of second long vein; first submarginal cell large, a fourth longer and quite as wide as the second posterior, its stem half its length; second posterior cell shorter than first submarginal, its stem nearly as long as the cell; upper cross-veins equal and meet, posterior cross-vein equal to and a little more than its length distant from the mid. Halteres with light stem and dark knob.

Length, 4 mm. Habitat: Camp Gregg, Pangasinan, Philippine Islands. Taken in August.

Described from one very perfect specimen sent by Capt. Schreiner, Asst. Surgeon U. S. Army. It is noticeably different even to the naked eye from most of the *Anophelinæ*, but I am not sure that it belongs to *Chagasia*, as Mr. Theobald makes the outstanding scales of the thorax of generic value, and states specifically that the abdomen is nude.

A new species in one of Mr. Theobald's new genera has also lately come from the Philippine Islands;

Pseudoskusea nigrotarsis, n. sp.—Female. Head very dark, covered with very dark brown flat scales, a pale (grayish) lateral stripe, no fork scales ; antennæ brown, verticels and pubescence brown, basal joint brown, with a few small brown flat scales ; palpi dark with dark brown scales ; proboscis the same ; eyes brown ; clypeus brown.

Thorax dark ; prothoracic lobes dark brown, with dark brown bristles ; mesonotum covered with dark brown slender curved scales having golden reflections, dark brown bristles, apparently two rows besides those over the wing-joint ; scutellum dark with curved scales, as on the mesonotum ; pleura brown with patches of long flat spatulate white scales and dark brown bristles ; metanotum very dark brown and shiny.

Abdomen dark, covered with very dark, almost black, scales, and white *mid-segment* bands not prolonged into lateral spots, light apical bristles. The light bands are grayish, and not so well developed on the more caudad segments. Venter dark scaled.

Legs : coxæ and trochanters light, with light scales and dark bristles; femora with dark brown scales dorsally, grayish ventrally, and a small gray apical spot, remainder of the legs entirely dark brown; ungues on fore and mid legs equal, and each with a small tooth, hind ungues simple.

Wings clear, with brown scales, the median small, truncate, the lateral lanceolate, and the ventral long, slender and slightly curved; cells short, bases about on a line, first submarginal a little longer and narrower than the second posterior, the stems nearly the same length, and approximately as long as the cells ; supernumerary and mid cross-veins meet, posterior cross-vein about one-half the mid and three times its own length distant ; halteres with light stem, knob dusky.

Length, 4.5 mm. Habitat : Infanta, Tayabas, Philippine Islands. Taken October, 1907.

The abdominal markings at first suggested *Skusea funerea*, Theob., but the fore and mid ungues bear the small tooth noted for *Pseudoskusea*. Described from one perfect specimen sent by Dr. Warriner in a collection mostly composed of *Stegomyia calopus* and *Culex fatigans*, varied by a couple of *Myzomyia Thorntonii* and two or three of *M. Ludlowii.*

In the description of *Cellia flava* in the January number (page 32, third line from bottom) the phrase "basal joint testaceous" should have appeared as part of the description of the antennæ, not of the palpi. The mosquito was taken at Camp Wilhelm, Tayabas (not "Tayubar"). A few other errors are obvious.

SEXUAL FORMS OF *TOXOPTERA GRAMINUM*, ROND.

BY F. L. WASHBURN, ST. ANTHONY PARK, MINN.

We have not found sexual forms of the so-called "green bug" in the field in Minnesota, nor have we been able to rear them outside in cages, but have had no trouble in getting this form in the insectary. Mr. R. A. Vickery, who has charge of our insectary work, reports them as appearing indoors on Oct. 15, shortly beginning egg-laying.

The winged males are smaller than the viviparous females, and have a larger number of sensoria on their antennæ. The oviparous females can readily be distinguished from the apterous viviparous females by their swollen hind tibiæ, by the eggs, which can be seen through the walls of the abdomen, and by the presence of circular sensoria on the antennæ.

In ovipositing, most of the eggs were placed on the upper side of dead leaves of grain. Apparently one female lays quite a number of eggs. Mr. Vickery reports finding ten nearly mature eggs in one female. The viviparous females continue producing young during and after the appearance of the sexual forms, and young were freely produced in the cold room of the insectary, although the temperature has been down to ten degrees above zero. The following is a brief description of the sexual forms of this species:

Oviparous Female.—(Fig. 5.) Length, 2-2.25 mm.; colour, yellowish-green, median line of abdomen darker green; head and prothorax somewhat paler than the rest of the body. Eyes black; antennæ black, except the two basal joints, and the basal half of the third, which are of the same colour as the head. Legs yellowish, tibiæ brownish toward the apex, tarsi black; cornicles greenish, their apex black; cauda greenish. Antennæ slender, hardly one-half the length of the body, no circular sensoria. Cornicles slightly tapering, not reaching to the end of the body. Cauda slender, somewhat constricted above the middle, about two-thirds the length of the cornicles. Tibia of hind leg swollen and thickly covered with sensoria-like swellings. Lateral tubercles small and single.

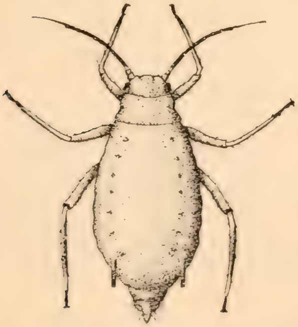


FIG. 5.—Oviparous female. (Original.)

Winged Male.—(Fig. 6.) Expanse of wings about 4.5 mm.; length of body about 1.3 mm. General coloration of the abdomen yellowish-green; head brownish-yellow; eyes black; antennæ black, except the two basal joints and the proximal half of the third, which are yellowish-green. Legs yellow, the female more or less dusky, the posterior pair darkest; apex of the tibiæ and tarsi black; cornicles yellowish, with black apex; cauda yellowish. Wings: costa and subcosta yellow; stigma paler, the inner edge of the stigma and the veins black. Antennæ long and slender, reaching to or a little beyond the end of the body; third joint with about twenty circular sensoria; fourth with about eighteen; fifth with about nine. Cauda slender, somewhat constricted about the middle, as long as the cornicles. Lateral tubercles small and single.

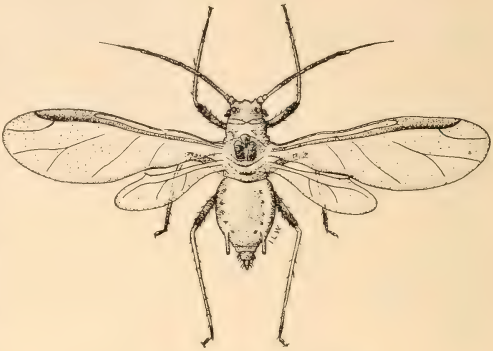


Fig. 6.—Winged male. (Original.)

Egg.—The egg is oval in shape, about .65 mm. long and .3 mm. broad. It is blue-green in colour when first laid, but changes to shiny black after a few days.

NOTES ON THE LEPIDOPTERA OF KASLO, B. C., WITH DESCRIPTIONS OF SEVEN NEW SPECIES.

BY GEO. W. TAYLOR, WELLINGTON, B. C.

Mr. J. W. Cockle, of Kaslo, so well known as an energetic student of the Kootenay Lepidoptera, has lately paid me a short visit at Wellington. He very kindly brought with him several boxes of Kaslo Geometridæ, and during his stay here we very carefully studied all the species, with the result that over 20 names will have been added to our British Columbian list.

About 12 of Mr. Cockle's captures appear to belong to undescribed species. Seven of these I shall describe in the present paper, but the others being uniques in Mr. Cockle's cabinet I shall reserve until further material can be obtained.

In addition to the above, Mr. Cockle brought specimens of 12 species which are new to the British Columbian list, as follows:

Rachela Bruceata, Hulst.—Differs from our coast form, *R occidentalis*, Hulst.

Rachela pulchraria, Taylor.—A new species described in a paper read by me last May before the Royal Society of Canada, and now going through the press.

Eupithecia scelestata, Taylor.— } Also described in the above-mentioned paper.
Eupithecia minorata, Taylor.— }

Eupithecia adornata, Taylor.—Described from Calgary. Three specimens taken at Kaslo by Mr. Cockle.

Eucymatoge vitalbata, D. & S.—One specimen, 6, viii, '07; previously only known from Alberta.

Cinglis ancellata, Hulst.—Common at Kaslo.

Diastictis bitactata, Walker.—Recorded by Dr. Dyar in Lep. Koot., but accidentally omitted from our B. C. list.

Diastictis denticulodes, Hulst.—Two male specimens, June 26 and August 20. This species was taken by Mr. R. V. Harvey in the Similkameen country last year, but it has not yet been recorded.

Selidosema separataria, Grote (?)—This is a species congeneric with our *S. excelsaria* and *S. albescens*. It seems to answer fairly well to Grote's description of *S. separataria* (from Arizona), and if not that species it must be undescribed. Mr. Cockle has three specimens, two males taken on August 15, 1905, and one female August 14, 1907.

Sabulodes catenulata, Grote.—Recorded by Dyar in Lep. Koot., but omitted in our B. C. check list because the specimen sent to me with this name by Mr. Cockle was *Synaxis pallulata*. I have since seen the true *S. catenulata* from Kaslo.

Sabulodes aurantiacaria, Pack.—One female specimen. Kaslo, June 20, 1901.

The following are new to the Kaslo list, though not to British Columbia:

Eupithecia castigata, Hubner; *Plemyria tristata*, Linn.; *Hydriomena speciosata*, Pack.; *Hydriomena costiguttata*, Hulst; *Xanthorhoë pontiaria*, Taylor; *Coniodes plumogeraria*, Hulst; *Synaxis pallulata*, Hulst; ***Metanema*** *inatomaria*, Gueneé; *Azelina ancetaria*, Hubner (typical).

DESCRIPTIONS OF NEW SPECIES.

1. *Eupithecia placidata*, n. sp.—Expanse, 24–26 mm.

Palpi large and bushy, porrect, dark gray, much darker than the thorax or abdomen. Front and thorax light gray, thorax becoming lighter, almost white posteriorly. Abdomen above a little darker than the thorax, dorsal tufts not conspicuous, except on second and third segments, where they appear to be black.

Wings rather long and acutely pointed. Fore wings even light gray, with a slight brownish tinge in the median space, particularly near the inner margin. The wings are crossed by numerous very fine broken black lines; about four of these are between the intradiscal line and the base of the wing. The intradiscal line is fairly well defined (in the best of the type specimens) from the median vein to the inner margin, where it is much nearer the base of the wing than it is at its point of origin on the costa. The median space includes two faint black cross lines more distinct near the inner margin, and an indistinct discal spot. Extradiscally there appear to be three lines, which are nearer to each other at the inner margin than they are at the costa; the outermost of the three is broken into dots.

The submarginal space is nearly free from markings, the submarginal white line is very faintly indicated; the marginal line on all the wings is dark, hardly interrupted at the veins.

Hind wings the colour of the fore wings, a little paler costally and darker at the extreme base; acute, slightly indented at vein 5. A minute discal dot. About seven very faint parallel cross lines, four being extadiscal and traceable right across the wings.

Fringe on all wings pale, with dusky median line almost continuous. Beneath pale leaden gray, with all markings very faintly and diffusely reproduced. The discal spots and the costal halves of the extradiscal lines on the fore wings being most clearly seen.

Abdomen paler than above; pectus white.

This species seems quite distinct from any other known to me. I have seen three specimens, all females, and all taken at Kaslo by Mr. Cockle on July 7 and 11, 1907.

One type is in my own cabinet, and the other two in that of Mr. Cockle.

2. *Eupithecia agnesata*, n. sp.—Expanse, 18 mm.

Palpi short and inconspicuous ; front almost black ; head, thorax and abdomen above gray ; a darker bar across thorax in front of the middle ; second segment of the abdomen darker gray ; dorsal tufts black.

Wings, ground colour gray, with a good many black scales.

Fore wings acutely pointed, both costal and outer margins being rather straighter than usual. Colour gray, with brown shade in extradiscal space and many black scales. The cross lines are black, but those in the basal area are not well defined ; extrabasally there is a distinct black spot on the costa ; median space blackish, the lines confused ; the ground colour shows more clearly around the distinct discal spot and at the base of veins 2, 3 and 4, the veins themselves being black. The median space is also distinctly lighter towards the inner margin ; pale bands bound the median space on both sides, and in each case these bands are cut by thin black lines parallel to the intradiscal and extradiscal lines respectively.

Submarginal space dark, traversed by a white zigzag submarginal line ; a conspicuous square black blotch on the costa, between the submarginal line and the extradiscal pale space ; a black marginal line ; fringe gray, cut with darker shades.

Hind wings: dark scales along the costa and between the inner margin and vein 2 ; the rest of the wing is almost clear of markings, except the reflections of the dark lines on the under side of the wing ; marginal line and fringe as on fore wings. Beneath gray, with very distinct black markings, especially on the hind wings. These markings consist, on the fore wing, of a straight intradiscal line, a prominent discal spot, a curved extradiscal line, heavy and distinct on the costal half, and a submarginal black band, broad on the costa, but becoming narrower towards the tornus ; this line is bounded by a distinct white zigzag line ; marginal line well marked ; inner margin quite clear of markings.

Hind wings very distinctly marked with black on a gray ground. There are two intradiscal lines, one median line passing through the distinct discal spot, a broad extradiscal line, then a pale space, then a strong waved black submarginal and a black marginal line, accompanied inwardly (as is the similar line on the fore wing) by a dark marginal shade.

This is a very distinct species, not like any other that we have in British Columbia, but slightly resembling the *Eupithecia edna* of Hulst.

The single type is a female taken at Kaslo on July 12, 1907, by Mr. Cockle, and it is in his cabinet.

3. *Eupithecia terminata*, n. sp.—This species and that next to be described both belong to a group of which the commonest form in British Columbia is one to which I have always applied the name *perfusca*, Hulst. The species in this group are very nearly allied, and with more abundant material I have already been able to distinguish four B. C. forms.

Dr. Hulst's types of *perfusca* came from Euston, Washington, and from Utah, the last named type being in the United States National Museum.

They may or may not be conspecific, and as they are not now in the best of condition it is not an easy matter to ascertain with certainty which form has the best title to the original name. I suggest, therefore, that the very common western form, to which I have limited it in my own cabinet, shall be allowed to retain the name *perfusca*, Hulst. This form has been identified by Dr. Dyar as conspecific with specimens so named for him by Dr. Hulst, and probably with the type from Utah, and it answers as well as any of its allies to Hulst's original description. If the other types in the Hulst collection prove to differ they may be given a new name. The true *E. perfusca* as thus restricted (type from Utah and B. C. specimens) can be distinguished from the other species of the group by a *brown shade*, which in fresh specimens is distinctly visible at the junction of veins 3 and 4 of the fore wing. This is easily seen in all of the 30 specimens before me at the present moment.

Eupithecia terminata may be described as follows :

Expanse, 25 mm. Very closely allied to *E. perfusca*, but it is a little larger and considerably darker in colour. The palpi (in *terminata*) are distinctly longer, the brown shade at the junction of veins 3 and 4 is absent.

The most easily-noted difference is, however, in the hind wings. In *E. terminata* these are rather heavily dusted with black scales, especially towards the outer margin, where they give the appearance of a wide submarginal dark band. This band is not intersected by the usual white submarginal line, which can be traced in *perfusca*, but there is a very slight indication of a white dot submarginally in the neighbourhood of vein 1. The margins of the hind wings are not so noticeably depressed at vein 5 as in *perfusca*.

This species has not yet been noticed on Vancouver Island, and is not a common insect at Kaslo.

I have marked as types three very perfect specimens, all taken by Mr. Cockle at Kaslo. Two of these are in my cabinet and one in that of the captor.

The dates are June 7, 1906; June 1, 1906, and May 11, 1906.

4. *Eupithecia Slocanata*, n. sp.—This species is also a near ally of *perfusca*, but may be distinguished by the narrower and longer fore wings, the very straight costal margins, the soft gray tone of the colouring of the whole insect, there being no trace of the brown tints of *perfusca*, and the general indefiniteness of all the lines. The hind wings above are paler and clearer of markings, and the white spot at the tornus on the fore wings is much more distinct than is the case in *perfusca*.

The types are two specimens from Kaslo, a male dated 30th May, 1907, and a female dated 27th July, 1907, in my own collection, and three other specimens (10th July to 1st August), also from Kaslo, in the cabinet of Mr. Cockle.

All the forms above mentioned, namely, *E. perfusca*, *E. terminata* and *E. Slocanata*, together with *E. scelestata*, were included by Dr. Dyar in his " Lepidoptera of Kootenai," under the name *E. satyrata*, Hubner (a European species). This was no doubt entirely due to the insufficiency of the material which he had before him at that time. He suggested, however, that the *perfusca* of Hulst might be the same thing, but he had not enough specimens in hand to enable him to discriminate the forms I have here characterized.

5. *Xanthorhoë planata*, n. sp.—I propose this name for the insect that is now passing in Eastern collections as *X. fluctuata*. I have it from Ottawa, New Jersey, Pennsylvania, etc., and it now appears among Mr. Cockle's Kaslo captures.

The differences between *planata* and *fluctuata* are not great, but appear to be constant. The ground colour of *fluctuata* has very commonly a slight greenish or yellowish tint, and the black markings are intense; in *planata* the colours are brown and brownish- or grayish-white. The extradiscal line in *fluctuata* is gently rounded out from the costa, and curves well inward between veins 4 and 6; in *planata* this curve becomes almost triangular, and the angle above vein 6 is acute. The basal line furnishes the best character. In *fluctuata* it is well rounded, having three outward and four inward scallops, and the space within it forms a conspicuous dark blotch. In *planata* the line runs out almost straight to cell, and then at right angles directly to the inner margin, where it is much nearer to the base of the wing than it was at its point of origin on the costa, and the basal blotch is not nearly so conspicuous as in *fluctuata*. Finally, the outer margin in *fluctuata* is less rounded than in *planata*.

These differences may appear slight, but they seem to be constant; and, in view of the fact that the two insects inhabit different continents, I think that the new name is justified. I have compared 19 European with numerous American specimens, and I have not found any intermediate forms.

6. *Aplodes unilinearia*, n. sp.—Expanse, 32–33 mm.

This species may be best described by comparing it with the known species of the genus. *A. brunnearia* is brown, so cannot be confused with any other species. *A. rubripontaria*, Pack., *Darwiniata*, Dyar, and two manuscript species of my own *intermediata* from Nevada, and *Californica* from California, all have the abdomen in the male with white dorsal spots circled with red, and have the extradiscal lines on the hind wings extending from margin to margin.

In *A. mimosaria* the lines are also continuous, but the abdomen has not any red spots. In *A. Hudsonaria* and in the present species, the abdomen agrees with *mimosaria*, but the outer line on the hind wings does not reach the inner margin of the wing. The difference between *Hudsonaria* and *unilinearia* is that in the males of the latter the inner lines on all the wings are obsolete, and the outer line on the hind wing in both sexes is further from the base of the wing and takes a different course, for while the same line in *Hudsonaria* would, if produced, reach the base of the wing, in *unilinearia* it would touch the middle point of the inner margin. *A. unilinearia* is a trifle larger than *Hudsonaria*, but not quite so large as *Darwiniata*. Mr. Cockle brought with him four specimens taken at Kaslo and dated 6th August, 1907 (a female), and 7, 14, 21 July, 1907 (3 males). The first three he retains in his own cabinet, and the last named is in my collection.

Two female moths from Victoria which I recorded (in CAN. ENT., XXXVIII., 206) as probably *A. Hudsonaria*, are *A. unilinearia*. The *Aplodes junctolinearia*, Græf, is evidently near to *Hudsonaria*, but Hulst says it is an *Anaplodes*, in which case it will readily be separated by its lack of the hair pencil on the hind tibiæ of the males.

(To be continued.)

NEW SPECIES OF COLORADO APHIDIDÆ, WITH NOTES UPON THEIR LIFE-HABITS.

BY C. P. GILLETTE, FORT COLLINS, COLORADO.

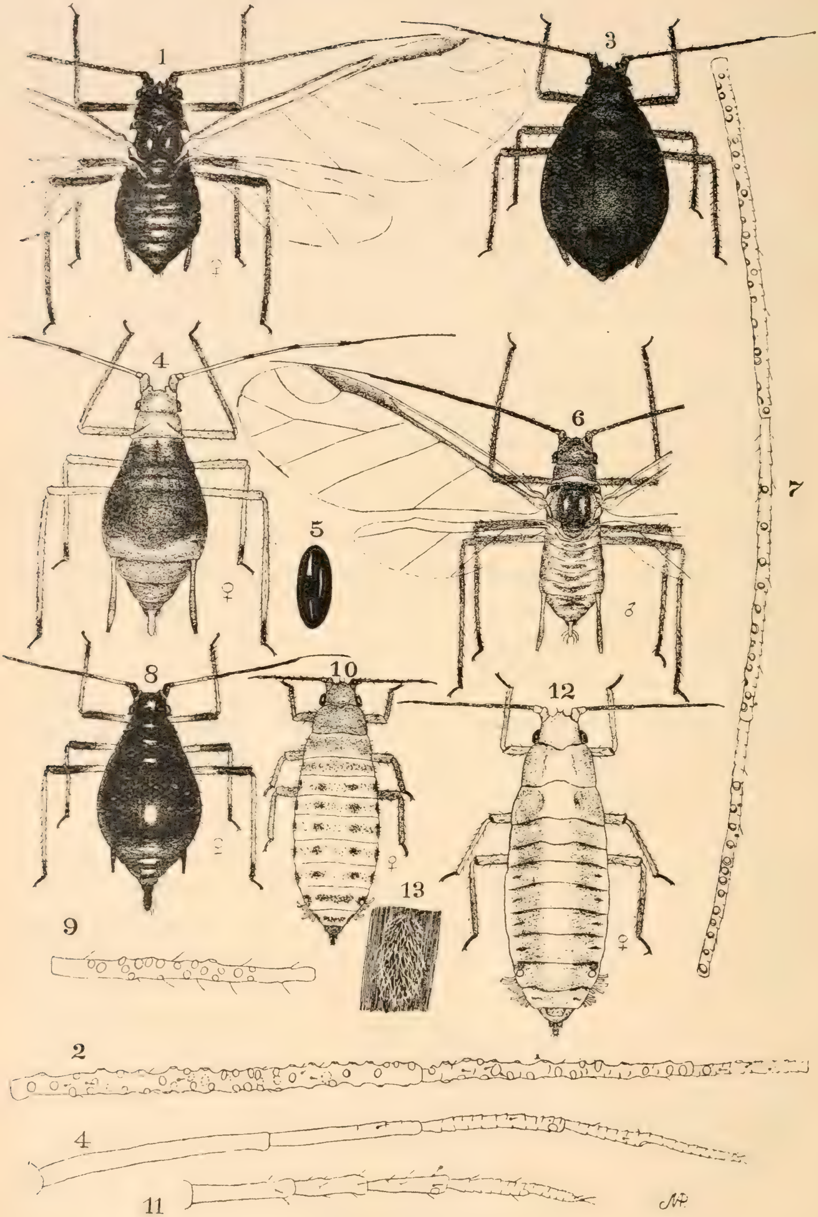
(Continued from page 20.)

During October, 1906, Mr. L. C. Bragg discovered upon the lawn grass (*Poa pratensis*) upon the campus of the Colorado Agricultural College, a black *Rhopalosiphum* that seems to be new. It continued upon the grass through the winter, and in warm situations, as upon the south side of buildings, it became extremely abundant in the spring. Through the summer and early fall the louse was not noticed or specially sought for, but this fall (1907) it is again abundant, especially next to the walls of buildings and along the border of walks. It accumulates chiefly upon the tender new leaves and upon the bases of the leaves. About my house during the early part of November and first ten days of December, the date of this writing, young and apterous females have been very abundant, and winged viviparous females not scarce. No sexual forms or eggs have been found. In places the blue grass has been killed during late fall and early winter by this louse.

Rhopalosiphum poæ, n. sp.—Winged Viviparous Female. Plate 3, figs. 1 and 3. Specimens taken on lawn grass *Poa pratensis*, at Fort Collins, November 17, 1907.

General colour, apparently a uniform black, but really a very dark dusky-brown or brownish-black. The base of the beak and the proximal ends of the femora are the only light parts. The tibiæ are lighter in colour than the femora, and are a dusky brown. The cornicles are lighter than the other portions of the body, and are light to dark dusky-brown. Thorax and abdomen highly polished above.

Length 1.80 mm.; length of antenna, 2.40 mm ; cornicles, .33 mm.; wing, 3.40 mm. Joints of antenna: III .70, IV .51, V .37, VI .14, VII .65 mm. While the joints vary some in length, they do not vary much from the above measurements. Third joint of antenna with many strongly tuberculate sensoria both above and beneath: joint four with about 24 similar sensoria (see fig. 2), and joint five with about three near its proximal end. The antenna is upon moderate tubercles, which are hardly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NEW SPECIES OF COLORADO APHIDIDAE.

noticeable on the outer margins, but are moderately produced on the inner margins, where they are somewhat swollen, as in *Myzus*. The first joint of the antenna is slightly gibbous, also reminding one of the genus *Myzus*. Wing venation normal, stigma dusky-brown, stigmal nerve strongly curved, the middle ocellus rather prominent, the lateral tubercles of the prothorax were slender or wanting, and the cauda very small, almost obsolete. The cornicles are shaped like an Indian club, with the greatest diameter a little beyond the middle and with the enlargement somewhat greater upon the inner side of the cornicles. The greatest diameter is more than twice the diameter at the proximal end. Beak short, barely attaining the second coxæ.

Apterous Viviparous Female.—(Plate 3, fig. 2.) Taken along with the alate form.

Length of body and of antenna, 1.9 mm. Joints of antenna: III .46, IV .34, V .29, VI .13, VII .50 mm. Length of cornicles, .29 mm.; shape of cornicles as in the winged form. The cauda is very short and pointed, black in colour, and does not exceed the tarsi in length. The colours are as in the alate form, except that the body is not highly polished, and the femora are not as black. Antennal tubercles rather large and strongly gibbous on the inner sides, as are the first joints of the antennæ. Except for the cornicles, the head characters of this insect would cause it to be classified as a *Myzus*. The body has many capitate hairs, which are most abundant about the head, the terminal segments of the abdomen, the legs and the proximal joints of the antennæ. The vertex is strongly produced, almost tuberculate between the antennæ.

No other food-plant than blue grass has been found for this species.

Rhopalosiphum nervatum, n. sp.—Described from specimens taken on wild rose leaves and tender stems, in Fort Collins, July 3, 1907. A light-green louse of medium size and with conspicuous black nervures in the wings, common upon wild and cultivated roses throughout the summer and fall.

Alate Viviparous Female.—Pale green in colour, with light yellowish-brown mesothoracic lobes above, dark red eyes, wings with heavy dark-brown venation, antennæ black, except joints 1 and 2 and proximal end of 3rd; tarsi and distal ends of tibiæ black, tibiæ and distal portions of femora and distal half of cornicles dusky, cauda pale green and .22 mm. long.

Length of body, 2.10 mm.; antenna, 2.90 mm. Joints of antenna about as follows: III .60, IV .43, V .40, VI .15, VII .90 mm. Cornicles, .66 mm., and distinctly but not strongly clavate. Wing, 3 mm. long, venation normal, each nervure terminating in a small dusky spot on wing margin. Stigma long and narrow, stigmatic vein very convex.

A very abundant species on tender terminal twigs of wild and cultivated roses about Fort Collins now. Many viviparous females getting wings.

Apterous Viviparous Female.—Differs from preceding by having the body light green throughout, antenna with 7th joint black, and the others light green annulated with black at joints and no sensoria on 3rd joint; distal portion of tibiæ, femora and cornicles hardly dusky, if at all. Taken along with the alate form above.

Apterous Oviparous Female.—(Plate 3, figs. 4 and 5). On rose bushes, Fort Collins, Oct. 17, 1907.

Adult oviparous females are light orange-red in colour upon head, anterior portion of thorax and terminal portion of the abdomen, including the cauda. The eyes are very dark red. The metathorax and all the abdomen to the region of the cornicles is light to very dark dusky green. Usually a broad pale yellow or yellowish-green area crosses the abdomen in the region of the cornicles, this light colour sometimes extending to the tip of the abdomen. In some specimens the entire body is pink in colour, the dark markings being fairly uniform. The antenna is pale in proximal half with distal ends of joints 3, 4 and 5, and all of joints 6 and 7 black; legs dusky yellow with tarsi and distal ends of tibiæ black or blackish; cornicles also dusky yellow with extreme tips black, gently curved and moderately clavate.

Length of body, 2 mm.; antenna, 2.5 mm. Joints: III .60, IV .40, V .43, VI .15, VII .80 mm. Cornicles, .68 mm.; cauda, .25 mm.; antennæ upon strong tubercles, prothoracic tubercles wanting, 2nd joint of antenna gibbous upon inner side.

A few light yellow viviparous females still on the leaves, but most of the lice are oviparous females and winged males now. A few eggs, bright green in colour, were seen upon the leaves, which became deep shining black later (fig. 5).

Winged Male.—(Plate 3, figs. 6 and 7.)

Colour, a pale greenish-yellow; head, prothorax, lobes of mesothorax above and below and three lateral spots upon the abdomen, yellowish brown; antennæ, cornicles, tibiæ, tarsi and distal ends of femora dusky to blackish ; eyes dark red ; in some specimens the dorsum of the abdomen shows transverse yellowish-brown lines upon many of the segments.

Length, about 1.40 mm.; antenna, 2.90 mm. Joints : III .60, IV .51, V .48, VI .16, VII 1 mm. Joints 3, 4 and 5 all have a row of very small and slightly tuberculate sensoria upon the under side for their entire lengths (fig. 7). Cornicles a little curved, distinctly clavate, and .55 mm. long ; venation of wing conspicuously black. Frontal tubercles for antennæ short but fairly stout ; 1st joints of antennæ gibbous upon inner side ; cauda concolorous with body or a little dusky.

On account of the somewhat incrassate cornicles I am placing this species in the genus *Rhopalosiphum*, but it has the general appearance of *Macrosiphum*. This was by far the most common rose louse about Fort Collins the past summer. Described from examples taken with the oviparous females above.

Macrosiphum Sanborni,* n. sp.

A brownish-black pyriform louse, with all parts of the body above highly polished. From chrysanthemums in greenhouse.

Apterous Viviparous Female.—(Plate 3, figs. 8 and 9.)

Colour, to the naked eye, very dark brown or black. The lightest portions are the margins of the meso- and metathorax, and the posterior and posterio-lateral portions of the abdomen. The cauda, the cornicles, the distal ends of the femora, the proximal and distal ends of the tibiæ, joints 1 and 2 and distal half of antenna, black ; greater portion of tibiæ, basal portions of femora and 3rd joint of antenna, brownish yellow ; eyes very dark red.

Length of body, 1.85 mm.; antenna, 1.85 mm. Joints : III .53, IV .27, V .26, VI .12, VII .50 mm. Cauda, .26, and cornicles, .24 mm.

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*Koch's black chrysanthemum louse, *Aphis chrysanthemi*, can hardly be this species, as it was described and figured as having the cauda very short, hardly longer than broad. *Macrosiphum campanulæ* (Kalt) seems to be the most closely-allied form so near as I can determine from the literature that I have access to.

long. The cauda is very long and stout for the size of the louse; the cornicles are stout, strongly tapering towards tip and without distinct flange; 3rd joint of antenna with about 15 to 20 circular sensoria, varying much in size; joint 4 without sensoria; a few stout hairs on joints 1 to 5; frontal tubercles rather prominent, converging towards the head, but widely separated. Thorax without lateral tubercles, or with very small ones.

The nymphs are dark amber in general colour.

Alate Viviparous Female.—Taken from chrysanthemums at Fort Collins, December 12, 1907.

General colour black, shining, with more or less of brown amber colour on posterior margins of the abdomen and in the region of the cornicles; coxæ and distal ends of femora and tibiæ very black; proximal ends of femora and tibiæ of a light amber colour.

Length of body, 1.43 mm.; antenna, 2 mm.; wings, 2.90 mm; cornicles, .20, and cauda, .23 mm. Joints of antenna: III .60, IV .26, V .30, VI .13, VII .54 mm. Joint 3 is strongly tuberculate, with a large number of sensoria. Joint 4 has about ten sensoria similar to those of joint 3; joint 5 has a single sensorium at distal end; joints set with numerous rather strong hairs.

For a fuller description of the alate female see paper on *Kansas Aphididæ*, in Vol. III, No. 1, Kansas University Science Bulletin, by C. E. Sanborn.

Prof. Sanborn, supposing he had before him Oestlund's *Nectarophora chrysanthemi* (quite a different species), described the alate female of this common chrysanthemum louse.

It is possible that this louse is the one called by Williams *Siphonophora chrysanthemicolens* in his *Host-plant List of North American Aphididæ*, Special Bulletin I., Department of Entomology, University of Nebraska, 1891, but without one word of description. In all probability it is what Mr. Gahon has referred to in Bulletin 119 of the Maryland Exp. Sta., p. 14, as the "Black Aphis of the Chrysanthemum," but also without description. I believe it entirely wrong to accept a name proposed as *chrysanthemicolens* was. If there is any group of insects more than another that need a very careful characterization to establish the identity of the species, it seems to me that it must be the Aphididæ.

We have found this louse common in greenhouses in Colorado, and upon chrysanthemums only. We have seen no sexual forms.

Nectarophora chrysanthemi, Oest, was taken upon a composite, *Bidens chrysanthemoides*, one of the Bur-Marigolds, and not upon chrysanthemum.

Brachycolus Ballii, n. sp.

A long, slender, flat, thrip-like louse with very short legs, antennæ and beak, and without cornicles; body more or less pulverulent throughout. On *Carex* sp.

Wingless Viviparous Female.—(Plate 3, figs 10 and 11.)

General colour very light greenish-yellow, mottled heavily with dusky spots above and below, and covered with white bloom. Body very long and narrow; medium length, about 2.25 mm.; width, .75 to .80 mm.; antenna, .80 mm. Joints: III .19; IV .13; V .14; VI .14; VII .09 mm. The cornicles are mere circular openings midway upon the 6th segment, and often difficult to find; cauda knobbed, short; supragenital or anal plate bifid; vertex evenly rounded and quite convex; eyes very dark red and entirely without tubercles; legs short and stout, the third pair hardly attaining the 7th abdominal segment; beak extremely short, not attaining 2nd pair of coxæ.

The dusky colour is usually solid upon head, pro- and mesothorax, and about 3 or 4 of the terminal segments of the abdomen above, and there is a large dusky spot on either lateral margin of each segment. Legs and antenna dusky to blackish; hairs upon legs, antenna and body short and fine but fairly abundant.

Described from many specimens taken at Fort Collins, Aug. 9, Oct. 30 and Dec 3. I have also taken specimens at Rocky Ford, Colo. All our specimens have been taken from *Carex Nebraskensis.*

Apterous Oviparous Female.—(Plate 3, figs. 12, 13 and 14.)

Length of body, 2.90 mm.; greatest width, .96 mm.; length of antenna, 1.37 mm. Joints: III .43, IV .26; V .26, VI .17, VII .15 mm. Legs very short; anterior tibiæ, .60 mm. long. Eyes without tubercles. General colour a pale greenish-yellow, with slight dusky transverse lines, more or less broken or indistinct at each suture of thorax and abdomen. Eyes black or very dark red; antenna black beyond 2nd joint, but more or less covered with a white pulverulence; tarsi and posterior tibiæ and a slight longitudinal line either side of the pronotum, dusky to blackish. No other dark markings. Cornicles absent, but in the place of each is a pore with a yellow spot just before it. Between the antennæ the vertex has a large flat bilobed tubercle or prominence. At the sides of joints 6 and 7 of the abdomen there are, on the ventral surface, upon either side, glands that secrete delicate silvery white wax threads which are used to cover the newly-laid eggs (fig. 13). Cauda knobbed as in *Callipterus;* anal plate bilobed; beak very short, not reaching 2nd coxæ.

Eggs.—(Plate 3, fig. 13.)

The eggs when freshly deposited are a beautiful pale yellowish green, lightly covered with bits of slender wax threads from the abdomen of the female. Dimensions of eggs, .71 by .29 mm. They are deposited upon the free surface of the leaves or in the fold along the mid-vein and near the base.

Described from a louse and her eggs that have been under observation for two weeks in the laboratory (12–4–'07).

This louse differs from the characters that Buckton lays down for *Brachycolus* by having the 7th joint of the antenna short, and by having the cauda knobbed as in *Callipterus.*

No alate form or pupæ have been seen.

It gives me pleasure to dedicate this interesting species, the first of this genus described in America, to Dr. E. D. Ball, who first discovered it in 1899 upon the grounds of the Colorado Agricultural College.

EXPLANATION OF PLATE 3.

Plate.—*Rhopalosiphum poæ*, n. sp.: 1, alate viviparous female; 2, joints 3 and 4 of the antenna of same; 3, apterous viviparous female. *Rhopalosiphum nervatum*, n. sp.: 4, apterous oviparous female; 5, egg of same; 6, alate male; 7, joints 3 and 4 of antenna of same. *Macrosiphum Sanborni*, n. sp.: 8, apterous viviparous female; 9, joint 3 of antenna of same. *Brachycolus Ballii*, n. sp.: 10, apterous viviparous female; 11, antenna of same; 12, apterous oviparous female; 13, egg, and 14, antenna of same. All the lice are enlarged 15 diameters. Original. M. A. Palmer, Artist.

THE ENTOMOLOGICAL SOCIETY OF AMERICA.

The third meeting of the Entomological Society of America was held at the University of Chicago, December 30 and 31, 1907, in affiliation with the American Association for the Advancement of Science, and other societies. About one hundred were in attendance, coming from as widely remote localities as Maine and California, Ottawa and Louisiana.

During Monday's sessions twenty-one interesting papers on a variety of Entomological subjects were read. An exhibit of specimens and materials was open to inspection, contributions having been made by eight members.

In the evening the annual address was given by Professor Herbert Osborn, of the Ohio State University, his subject being "The Habits of Insects as a Factor in Classification." The address was followed by a most enjoyable smoker, at which the members of the Society and their friends were the guests of the Entomological section of the Chicago Academy of Sciences.

At the annual business meeting on Tuesday, the 31st, the following officers were elected :

President, Dr. William Morton Wheeler.

1st Vice-President, Dr. John B. Smith.

2nd Vice-President, Rev. Prof. C. J. S. Bethune.

Secretary-Treasurer, J. Chester Bradley.

Additional members of the Executive Committee : Dr. James G. Needham, Prof. V. S. Kellogg, Prof. Herbert Osborn, Prof. J. H. Comstock, Dr. P. P. Calvert, Mr. F. M. Webster.

STANDING COMMITTEE ON NOMENCLATURE.

Dr. H. T. Fernald, to serve 3 years.

Prof. T. D. A. Cockerell, to serve two years.

Dr. E. P. Felt, to serve one year.

COMMITTEE ON NOMENCLATURE..

Dr. Fernald moved, seconded by Dr. Smith,

1. That the Entomological Society of America hereby endorses the Code of Nomenclature adopted by the International Zoological Congress as the code which should be used by the members of the Society so far as it can be applied.

2. That cases not covered by this code which may be presented to the Society for consideration, be referred to a standing Committee on

Nomenclature, to consist of three members, one member of which shall be elected each year for a term of three years, and the opinion of this Committee on cases referred to them shall be reported to the Society at the first annual meeting subsequent to their reference to the Committee.

Mr. Bradley moved to amend by striking out the second clause, because entomology should not be treated as distinct from zoology in general, and because the Commission on Nomenclature established by the International Congress of Zoology is the sufficient and proper body before which to bring such question for decision.

Dr. Fernald stated that the reports of the Commission on Nomenclature of the International Congress of Zoology are greatly delayed by the fact that the Congress meets only once in three years, and by the rule that a question must be presented at least a year before the meeting at which it is to be considered. It was not the intention of the mover that the Committee should act in opposition to or independently from the Commission on Nomenclature, but that it should be instrumental in voicing the needs of entomology before that body, which should be the final court of reference.

With that explanation, the amendment was withdrawn and motion passed.

PUBLICATION OF A JOURNAL.

Perhaps the most important act of the meeting was embodied in the following resolutions adopted by the Executive Committee and confirmed by the Society :

1. That the Society undertake a publication to be called "Annals of the Entomological Society of America," to be issued in quarterly fascicles.

2. That it include only papers of importance or marked merit, and that each be issued and bound separately as well as in fascicles, so that each paper may be sold separately.

3. That proceedings of the meetings be included either at the beginning or end of each volume, and form one separate, which is to be sent to all members of the Society.

4. That a subscription price of $1.00 in addition to the membership fee be charged members for the annals, and that the subscription price to non-members, libraries, etc., be $3.00.

5. That an Editorial Board be selected by the Executive Committee, and that this Board shall select one of its members as managing editor, who, with his associates, shall be responsible for the selection of material to be published.

6. That if possible some one living in a suitable location, and who can undertake the work of managing editor for a series of years, be selected for this position.

7. That details not covered in this report are to be determined by the Editorial Board.

8. That actual publication under the provisions of this report be inaugurated as soon as possible.

It will be seen from the above that all members will receive the number containing the full proceedings of the meetings free, and upon payment of $1.00 the entire annals, while the regular subscription price to non-members will be $3.00.

A resolution was passed limiting the number of Fellows for the present to 10% of the membership.

The meeting then adjourned, to meet next December in Baltimore.

During the sessions the Executive Committee elected the following Fellows: Justus Watson Folsom, William Joseph Holland, Clarence Preston Gillette, Lawrence Bruner, Mark Vernon Slingerland, Henry Clinton Fall, Charles Lester Marlatt. Twenty new members were also elected. J. C. Bradley, Secretary-Treasurer.

SYNCHLOE LANCEOLATA, BOISDUVAL, WITH A DESCRIPTION OF A RELATED SPECIES FROM SOUTHERN CALIFORNIA.

BY FORDYCE GRINNELL, JR., PASADENA, CALIF.

The purpose of this paper is to give a description of an interesting species of Synchlöe related to *lanceolata*, Boisduval.

Synchloe lanceolata was described in 1852, and again in the second paper in 1869, in the classical and historically interesting paper, "Lépidoptères de la Californie." The type locality was given as "Montagnes de la Juba," and that of Dr. Behr's *Edwardsii*, described subsequently, as "Downieville, Sierra county"; while my specimens are from Plumas county, to the northward, but in the same faunal area, and so are really typical.

Synchloe lanceolata (Boisduval), Dyar.

♂. Upper side white. Primaries with a comparatively large, black lunule at end of cell, with the concave side turned towards the apex of the wing. Apices more or less shaded with brown scales, especially along the nervules. Hind wings white. Under side, wood-brown, with faint traces of ochre yellow along veins and in the apices. Discal spot more curved than above. On the hind wings the colour is more dense towards the costa. A large white, slightly tapering streak, directed inwardly. Expanse, 40 mm.

♀. Similar to the male, but larger.

Synchloe australis, new species.

♂. Upper side: Primaries, white; apex rather densely shaded with blackish-brown, especially along the veins, gradually thinning out towards the inner margin. The discal spot is simply a blackish-brown dash, oblique. Hind wings white, the markings of the under side giving it a diluted appearance. Under side: Primaries white, the apices suffused with lavender-gray, lightly marked with the prevailing colour of the secondaries, and also along the costa to the base. Discal spot larger and slightly crescent-shaped. Secondaries varying from drab to olive or hair-brown, mottled in dashes and streaks, densest along veins and towards base and costa. The white dash is comparatively small. Antennæ annulated; club dark brown, tip yellowish. Thorax and base of wings, blackish-brown.

Expanse, 50 mm.

♀. Similar to the male.

Types, 1 ♂ and 2 ♀ ♀, in the collection of the author. Five topotypes in the collection of V. L. Clémence.

Types locality: Arroyo Seco Cañon and Millard Cañon, Pacific slope of the St. Gabriel Mountains, Los Angeles county, California. Elevation 2,500 feet. April 6, 1899, and April 8, 1907.

I have thirteen typical specimens of *lanceolata* from Plumas county, Calif., July, 1902, before me.

These two species differ so decidedly in practically all points that they can hardly be confused by anyone; the density of the apical shading, the shape of the discal spot, the exact colouring of the under side of the secondaries particularly, and the white dash, are all distinctive and easily-observed characters. The colour of the under side of the secondaries has heretofore been very vaguely indicated, but here they are very important, so I have consulted Ridgway's "Nomenclature of Colours" for the correct ones.

Students of butterflies have sadly neglected the comparative study of the species to the minutest details, and their relation to the evolution of the physiography of the region; before we can gain any knowledge of the evolution, origin and distribution of the butterflies, the study of physiography must be taken up along with the butterfly structure.

Synchloe australis and *lanceolata* are Transition Zone species; *lanceolata* belongs to the Sierra Nevadan faunal area, while *australis* belongs to the Southern Sierran. The relation of these forms to the evolution of the physiography of the country will be undertaken at some future time.

Mr. E. K. Harvey, of Los Angeles, has four specimens of *australis* in his collection captured in Eaton Cañon in the San Gabriel Mountains, on the following dates: March 16 and 21, 1901, and April 21, 1899. Three males and one female. Mr. Harvey has noticed the striking differences between these and specimens of typical *lanceolata* which he possesses from Siskiyou county and Placer county.

W. G. Wright, in his "Butterflies of the West Coast," refers to this species as the southern form of *lanceolata*; he does not refer to the distinctive characters of the under side, only saying that the apices are a little darker. He figures only the upper side, his specimens being from "City Creek, Cal.," near San Bernardino. The localities in Mr. Wright's book are very vague and indefinite, his descriptions likewise, all of which lessen the value of the book.

In conclusion, I will give in synoptical form the characters of these two species, to help in their readier discrimination:

1. Discal spot crescent shaped; apical shading comparatively obscure; under side of secondaries wood brown and ochre yellow; white dash large...*lanceolata*, Bdv.
2. Discal spot straight; apical shading very intense; under side of secondaries drab or hair-brown; white dash comparatively small...*australis*, n. sp.

ON SOME APPARENTLY NEW CECIDOMYIIDÆ.

BY WILLIAM BEUTENMULLER, AMERICAN MUSEUM OF NATURAL HISTORY, NEW YORK.

Cecidomyia (?) collinsoniæ, sp. nov.—*Larva.*—White, broad and rounded. Anal segment somewhat truncate, with the sides rounded. Breastbone or anchor process very broad at the apex, and with two widely-separated lateral, short projections, the part between them even. Basal portion of breast-bone not visible. Length, 2 mm.; width, .75 mm.

Gall.—Green, onion-shaped, pubescent, succulent, thick-walled, with a narrow larval chamber inside containing a single larva. Length, 4–7 mm.; width, 3.50–5 mm.

Collected at Garrison, New York, by T. D. A. Cockerell and myself, in August, 1907. The gall occurs singly or in numbers on the under sides of the leaves of horse-balm *(Collinsonia Canadensis).*

Cecidomyia (?) collinsonifolia, sp. nov.—*Larva.*—White, elongate, narrow. Anal segment rounded. Breast-bone long, narrow, gradually broadening toward the apex, where there are two rather sharp teeth, with the space between very deep. Length, 1.75 mm.; width, .50 mm.

Gall.—Pale green, elongate, narrow swellings on the mid-rib, or larger veins on the under side of the leaf of horse-balm *(Collinsonia Canadensis).*

Collected at Garrison, New York, by T. D. A. Cockerell and myself, in August. The gall contains a single larva.

Cecidomyia (?) triadenii, sp. nov.—*Larva.*—Pale orange, long and narrow, much longer than broad, and of almost equal width. Anal segment rounded. Breast-bone or anchor process prominent, long, anterior portion greatly enlarged, with a projection on each side and two lateral teeth at the apex. Length, 4 mm.; width, .75 mm.

Gall.—Green, globular or somewhat elongate swellings on the stalk of marsh St. John's wort *(Triadenum virginicum).* Length, 6–10 mm.; width, 5–5.50 mm.

Collected in Middlesex County, New Jersey, Sept. 15, 1907, by W. de W. Miller.

Cecidomyia (?) angelicæ, sp. nov.—*Larva.*—Orange, elongate, sides parallel. Each segment with a minute filament on each side, and a number at the terminal end of the anal segment, which is rounded. Breast-bone or anchor process long, slender and parallel to the broad anterior portion, which has a long, sharp projection on each side and three apical teeth, the median one being shorter. Length, 3.50 mm.; width, .75 mm.

Gall.—Elongate swellings of the stalk of the pubescent angelica *(Angelica villosa).* Each gall contains numerous larvæ, which are in a large chamber filled with pith of the plant. Sometimes as many as four swellings are on a single stalk. Length, 25 to 55 mm.; width, 8 to 14 mm. The larvæ hibernate in the gall.

Collected in Middlesex County, New Jersey, Oct. 22, 1907, by W. de W. Miller.

Cecidomyia (?) boehmeriæ, sp. nov.—*Larva.*—Pale yellowish-white, elongate, segments of almost equal width. Anal segment rounded and without filaments. Breast-bone or anchor process very long and slender, gradually widening towards the anterior portion, which has two lateral teeth and a shorter median one. Length, 2 mm.; width, .50 mm.

Gall.—An elongate, fusiform swelling of the stalk of false nettle *(Boehmeria cylindrica).* Inside is an elongate, narrow chamber, inhabited by a single larva. Length, 12 mm.; width, 6 mm.

Collected at Shushank, New York, Sept. 30, 1907, by Frank Dobbins, and at Fort Lee, New Jersey, by the writer.

Cecidomyia (?) fulva, sp. nov.—*Larva.*—Orange. Breast-bone or anchor process very long, slightly increasing in width toward the apex, which has two rather long, sharp lateral teeth. Length, 1.25 mm.; width, .75 mm.

Gall.—Green, succulent, globular or irregularly rounded swelling on the stem, petiole or leaf of the jewel-weed or balsam *(Impatiens fulva).* Inside is a rather large chamber inhabited by a single larva. Length, 7 mm.; width, 4 mm.

Collected at Shushank, New York, Sept. 30, 1907, by Frank Dobbins, and at Fort Lee, New Jersey, by the writer.

Lasioptera lycopi Felt—*Larva.*—Pale orange, long and slender, with the segments of almost equal width. Breast-bone or anchor process long, anterior portion much swollen, with two long lateral teeth rounded at the tip. Length, 1.33 mm.; width, .25 mm.

Gall.—Rounded or globular, green, swellings on the stalks of bugle-weed *(Lycopus virginicus).* Inside is an elongated chamber containing a single larva. Length, 10 mm.; width, 4 mm.

Collected at White Plains, N. Y., Sept. 31, 1907.

BOOK NOTICE.

Mosquito Life. By Evelyn Groesbeeck Mitchell, A. B., M. S.; G. P. Putnam's Sons, New York and London. The Knickerbocker Press, 1907.

This neat little volume of 280 pages has been published by Miss Mitchell as a graceful tribute to the memory of the late Dr. J. W. Dupree, under whom she worked, and whose notes she acquired. The volume is really a review of the same ground covered by Dr. L. O. Howard's "Mosquitoes," brought up more nearly to the level of present knowledge, and illustrated by original drawings made by the author. It may take the place of a second edition of that work, which has never been published, although so much needed. Miss Mitchell's original keys for the determinations of species will, no doubt, prove convenient to field workers and physicians, as she has largely avoided the use of microscopical structures. In the title the species of the United States are said to be treated of, but in reality, only those of the Atlantic Coast region are dealt with. The book has not been revised to date, the most recent contributions to the knowledge of the subject being unnoticed ; but for this we can scarcely blame the author, as the subject proceeds at such a rapid pace that any book must lag behind to some extent.

We regret to notice a lamentable lack of credit to Dr. Howard and his assistants. The book reads like a second edition of Dr. Howard's work. Mr. Coquillett's classification has been absolutely adhered to ; the descriptions of larvæ sound so familiar that the reviewer involuntarily turned to the title page to see if they were not his own, while the illustrations show the effects of the influence of Mr. F. Knab's expert artistic criticism. Probably Miss Mitchell herself scarcely realizes how much information she has absorbed from the Government Bureaus. We should like her to try and imagine what her book would have been like if she had written it before she came to Washington. Of Dr. Howard's assistants, Mr. Coquillett only receives some, though inadequate, recognition. His name might have better assisted in gracing the title page. A certain obtuseness of scientific conscience is, we think, responsible for this condition, and it has further led our author to publish her work independently, although she was employed to assist in the preparation of the much-delayed Carnegie Institution Monograph, and had in her hands for study the material collected for that work. An attempt has been made to avoid responsibility for this action by re-examining those species that could be found in the collections of the New Jersey and New York State entomologists, and we have no doubt that all the figures were carefully redrawn out of office hours. A more candid course on Miss Mitchell's part would not have detracted from the credit due her, though it might possibly have prevented the publication of the book. Her action in copyrighting drawings which she had been paid to prepare for the Carnegie Institution Monograph, is certainly indefensible. Following the example set by the objects of her study, Miss Mitchell has played the part of a feminine Psorophora among the scientific Ædids of Washington. The Ædids themselves can do no less than commend the work, however much they may deprecate its manner of production. Our readers will find it a useful handbook. HARRISON G. DYAR.

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DESCRIPTIONS OF SOME NEW SPECIES OF AMERICAN NOCTUIDÆ.

BY HARRISON G. DYAR, WASHINGTON, D. C.

Gortyna ochroptena, n. sp.—Pale stramineous, only slightly tinted with brown, the lines faint and obscure, arranged as in *rutila*, Guen., and allies. Ordinary spots white, claviform and orbicular forming an oblique row of three spots, the middle one smallest; reniform with white central line, all the surrounding spots white; subterminal shade purplish, defining a yellow apical patch. Hind wings whitish. Expanse, 33 mm.

One ♂, Denver, Colorado (collection of Wm. Schaus).

Type, No. 11411, U. S. National Museum.

A Western species of the *rutila* series, distinguished by its very pale colour. The colour is much the same as in *furcata*, Smith, but without the expanded spots of that species.

Gortyna nepheleptena, n. sp.—Fore wing very heavily shaded with brown down to and including the submedian fold, the space between that and the inner margin as far out as the outer line clear yellowish, irrorated with red-brown; an apical yellow patch, from which the subterminal line is clearly indicated as a series of little scallops to the anal angle; ordinary lines lost in the dark colour; basal spots yellow in the dark ground, two near the costal edge, followed by a very narrow yellow line; orbicular and claviform forming three rounded white spots, nearly equal, the middle one eroded on the inner side; orbicular a slender curved yellow line, surrounded by the full complement of spots, all white, none large. Hind wing tinged with fuscous to the outer margin, which is somewhat broadly and contrastingly pale. Expanse, 33 mm.

One ♀, New York [exact locality unknown], (collection U. S. National Museum).

Type, No. 11412, U. S. National Museum.

The specimen was identified by Prof. J. B. Smith as "*Hydrœcia appasionata*, Harv.," at some date, apparently many years ago, for it has nothing to do with that pretty and now well-known species. It belongs to the *rutila* series, but it is much more heavily dark-shaded than any described form. It is perhaps nearest to *Merricata*, Bird, but that has the brown shading powdered and diffused, not obscuring the ordinary lines.

Gortyna marginidens, Guenée.—A specimen before me was compared with Guenée's type by Mr. Schaus, and a reading of Guenée's description appears to me to entirely confirm the determination. The species is, however, not the one identified as *marginidens* by Prof. J. B. Smith and by Mr. H. Bird, but the "dark form" of *circumlucens*, Smith, referred to by Mr. Bird as forming galls in the stems of hop (CAN. ENT., XXXIX, 137, 1907). The types of *circumlucens*, while similar in markings, are considerably darker in colour than the *marginidens*, and, considering how closely the species of *Gortyna* are allied, I am inclined to retain *circumlucens*, for the present at least, as a distinct species, the larva being still undiscovered. The species heretofore known as *marginidens* will require a new name, and may be known as

Gortyna Birdi, n. sp.—Of the same pattern and coloration as *marginidens*, Guen., but the colours more diversified, the median space more contrastingly lighter below; at the base of the wing, beside the single white speck, two spots, a waved line and a dot; reniform spot larger, more expanded, similarly formed; orbicular with a central brown dot, not solid; apical pale patch somewhat more diffused.

Eight specimens before me, the one selected as type being a male in fine condition, bred by Mr. Bird at Rye, New York.

Type, No. 11410, U. S. National Museum.

Gortyna nephrasyntheta, n. sp.—Similar to *Birdi*, Dyar, and as large as the largest female of that species before me. The fore wing is much the same, but the colour is less bright, and the shadings less contrasted, being of a dull tan brown. The markings are all the same, the principal difference residing in the reniform stigma, which is very large and almost solidly white, the centre line being white instead of yellow as in *Birdi*, and closely fused to its large surrounding spots, their separations forming narrow hair-lines. Apical blotch large, pale. Expanse, 47 mm.

One ♀, Plummer's Island, Maryland, Sept. 27, 1904 (E. A. Schwarz).

Type, No. 11413, U. S. National Museum.

I have had this specimen under the label *marginidens*, Guen. (= *Birdi*, Dyar), for several years, but now that Mr. Bird has shown how closely these species run, it is impossible to longer hold it in that association.

Gortyna anargyrea, n. sp.—Fore wing light buff, sprinkled with brown atoms; inner line faint, double, brown, powdery; median shade powdery, angled on the median vein; outer line distinct, purplish, slightly curved at its upper fourth, followed by a lighter purple shade, that is pointedly produced on the veins without, quadrately incised near the apex, followed by a narrow space comparatively devoid of the brown powdering, which obtains again terminally; spots yellow, without any white, basal spots and narrow subbasal line shown, claviform obliquely elliptical, cut by the submedian fold; orbicular small, rounded, cut by a brown dot on its outer side; reniform a narrow yellow line, surrounded by small yellow spots. Hind wing shaded with fuscous except on the margin. Expanse, 34 mm.

One ♂, Colorado [exact locality unknown], (collection of Wm. Schaus).

Type, No. 11414, U. S. National Museum.

The specimen bears Mr. Schaus's label, "*Hydrœcia purpurifascia*, G. and R.," but it differs from that species in its lighter appearance, caused by the reduction of the terminal shading and the total absence of the white spots. It may be considered as a Western representative of *purpurifascia*, specifically distinct, I have no doubt.

Gortyna triorthia, n. sp.—Fore wing light yellow, heavily shaded with brown in the middle, leaving the costal and inner edges and the space between median and outer lines clear yellow; inner line faint, double, brown, forming an outcurve below vein 1; median line shaded distinct, bent where it touches the reniform below; outer line very straight, purple, followed by a purple shade, which is dentate on the veins without; subterminal line indicated by a narrow, clear yellow space; red powderings terminally; claviform and orbicular in a rigid, oblique line, white, full, nearly fused, the claviform dumb-bell-shaped, the orbicular elliptical; reniform a yellow arc, surrounded by spots, a narrow white one at the upper and lower corners within, four without, of which the second from the top is rather strongly shaded with yellow. Hind wing testaceous, faintly shaded with brown subterminally. Expanse, 36 mm.

Type, one ♀, Holderness, New Hampshire, Sept. 21, 1883 (collection of C. V. Riley). I also associate a ♀, Centre, N. Y., Aug. 30, 1877 (W. W. Hill); a ♀ marked "391"; a ♀, Rhinebeck, N. Y., Sept. 13, 1888 (Miss Grace Asher); a ♂, Kittery Point, Me., Sept. 10, 1881 (R. Thaxter); and a ♂, Colorado (D. Bruce, collection of Wm. Schaus).

Type, No. 11415, U. S. National Museum.

Allied to *purpurifascia*, but distinguished by the straightness and confluence of the inner spots and the median shading. Less closely allied to *Harrisii*, Grt. All the specimens were labelled "*purpurifascia*," Mr. Schaus's specimen being marked "*purpurifascia*, Grt., comp. B. M."; but these species are so much alike that any comparison might easily err, and I prefer to retain Mr. Bird's identification of *purpurifascia*, which I think is correct.

Chabuata rectinubila, n. sp.—♀. Head and thorax brown, very thickly irrorated with white; abdomen gray-brown, irrorated with gray. Fore wing dull brown, very thickly irrorated with white; faint traces of the antemedial line; reniform indicated by a faint pale discoloration; postmedial line very faint, bent outwards below costa, excurved to vein 4, then incurved, faint traces of the subterminal line, preceded by an oblique straight pale shade from costa before apex to inner margin before tornus. Hind wing brownish shaded, the veins darker, the marginal areas broadly suffused with brown; the under side white, irrorated with brown, a discoidal point and indistinct curved postmedial line.

♂.—Similar to the female. Anal tuft somewhat ochreous.

Eight specimens, Orizaba, Mexico (collection of Wm. Schaus).

Type, No. 11318, U. S. National Museum.

Allied to *C. mutina*, Schaus, with which it was confused in the Schaus collection.

THIRD SUPPLEMENT TO THE "CATALOGUE OF APHIDÆ."

BY G. W. KIRKALDY, HONOLULU, H. ISL.

In enumerating the synonyms of *Chaitophorus* (CAN. ENT., XXXVII, 1905, p. 417), I was able to give seven, of which, however, five had been inaccessible to me. I am in no better plight now, except that apparently accurate references to some of these are given in a paper by Ritsema (cf. A. M. N. H. (4), VI, 93, 1870). The following are probably correct:

||†*Phyllophorus*, Thornton, 1852, Proc. E. S. London, N. S., II, 78 .... t. *testudinatus*.

||†*Chelymorpha*, Lane Clarke, 1858, Objects for the Microscope .... (London), p. ? t. *phyllophora*.

The correct citation of *Rhizaphis* (CAN. ENT., XXXVIII, 1906, p. 10) is apparently "Planchon, 1867, C. R. Paris, xlvii, 588, t. *vastatrix*."

DR. DYAR'S CRITICISM OF "MOSQUITO LIFE."

BY D. W. COQUILLETT, WASHINGTON, D. C.

Dr. Dyar's criticism of "Mosquito Life" in the February number of the CANADIAN ENTOMOLOGIST (it cannot possibly be called a review—the author informs me that no copy of the book was sent to Dr. Dyar) calls for a reply, that the many false statements may be corrected. To define my own position in the case, it may be stated that when Miss E. G. Mitchell, the author, began work on the drawings for the Carnegie Monograph, she was assigned a desk in Dr. Dyar's office at the National Museum, and he was given general supervision of her work. Instead of giving her a specimen to draw, he handed her two trays containing about 35 slides of larval skins, bidding her compare them critically and ascertain if more than one species was in the lot. How well she did her work may be gleaned from the first paragraph of an article in the Journal of the N. Y. Ent. Soc., Vol. XIII., p. 107, under the title "Brief Notes on Mosquitoes," by Harrison G. Dyar, A. M., Ph. D., and which runs as follows:

"Distribution of *Theobaldia absobrinus*, Felt.—In re-examining my series of *Theobaldia incidens* from British Columbia (Proc. Ent. Soc., Wash., VI., 38, 1904), I find it to contain a mixture of a second species which I am able to identify with *T. absobrinus*, Felt."

Not one word in the entire article to indicate that the work had been done by any other person than himself! The lady continued her work for several weeks, then informed me that she would prefer to resign rather than continue working under the unpleasant existing conditions. She was therefore given desk-room in my office in the National Museum, where she continued her work on the drawings under my general supervision, and so matters stood until the cessation of her work about a year later.

I will now take up the more flagrant of Dr. Dyar's false satements in the order in which he gives them:

1. "In the title the species of the United States are said to be treated of, but in reality, only those of the Atlantic coast region are dealt with." Only a casual glance through the book is necessary to reveal the fact that *Franciscanus*, *incidens*, *varipalpus*, *Curriei*, *pullatus*, *Fletcheri*, *Spenceri*, etc., all western or Pacific Coast forms, are dealt with.

2. "The illustrations show the effects of Mr. F. Knab's expert artistic criticism." Without wishing in the least to detract from Mr. Knab's ability as a critic or artist, I am in a position to know that he never saw any of the drawings of the adults, and an incident which he himself related to

me indicates that the author herself was the real critic. At her first visit to his office, he showed her one of his wash-ink drawings of a larva. Although she did not know the species, she told him that she was sure, from those she did know, that he had omitted two hairs, indicating on the figure where they ought to be. Mr. Knab vehemently denied the omission, protesting that he had been extremely careful not to overlook a single hair. She asked to see the specimen on which the figure was founded, and upon examining it, the hairs were found, and Mr. Knab was manly enough to acknowledge himself in the wrong!

3. "Mr. Coquillett only receives some, though inadequate, recognition. His name might have better assisted in gracing the title page." By this it is evidently intended to imply that I wrote part of "Mosquito Life." As a matter of fact, the MSS. of that book were written by Miss Mitchell at her home in East Orange, N. J., and sent to the publishers before she returned to Washington. I was in Washington all this time, as the records of the Bureau of Entomology show, and neither wrote nor dictated any part of the book.

4. "A certain obtuseness of scientific conscience is, we think, responsible for this condition, and it has further led our author to publish her work independently, although she was employed to assist in the publication of the much-delayed Carnegie Institution Monograph, and had in her hands for study the material collected for that work." She was not employed to assist in the preparation of the *text* of the Monograph, and at no time did she have in her hands the Carnegie material *for study;* during all the time she was at work on the Monograph I had charge of the adults, while Dr. Dyar had control of the early stages. All she was employed to do was to make drawings of some of the early stages and details of the same, besides copying in charcoal some of the line drawings she had previously made for Dr. Dupree, and which he had generously loaned her for that purpose. During the period when she was drawing for the Monograph, she devoted her spare time to completing a series of keys to the North American mosquitoes, begun in Louisiana, intending to use them as a thesis for the degree of M. S. in the George Washington University. No secret was made of this, and, as a student of the above University and as a citizen, she had right of access to the study-collection of the Museum. The chaotic condition of the larva collection at that time caused her unwittingly to incorporate in the keys a few species belonging to the Carnegie collection. These species were not new at the time, and Dr. Dyar's keys containing all of these and many other species were pub-

lished before the book was even written. However, even on this score, no objection can possibly be applied to her book, since her keys were entirely reconstructed from non-Carnegie material.

5. "Her action in copyrighting drawings which she had been paid to prepare for the Carnegie Institution Monograph is certainly indefensible." Not one of these drawings was published in "Mosquito Life," and as Dr. Dupree had already given the Carnegie people permission to publish such of them as were copied from his own, and the author was merely acting in his place, the publication of the originals in "Mosquito Life" in no way affected this permission.

The above is, I believe, sufficient to show the utter falsity of Dr. Dyar's charges. The writer regrets that, as a matter of justice as well as of record, the occasion necessitates the preparation and publication of the present reply. The author's well-known scientific probity should have precluded the possibility of any personal attack.

A FURTHER NOTE ON SYNELYS ENUCLEATA.

BY L. W. SWETT, MALDEN, MASS.

In the December CAN. ENT., Vol. XXXIX, p. 412, Mr. Prout has added some very interesting material to what I had found out. He seemed puzzled about two things: first, why I thought the original description or typical form was drawn up from one specimen. In the last line of Guenée's description he says "(♀ semblable)"; this Mr. Prout must have overlooked, as he says it was drawn up from "6 examples," and the typical form was the one without blotches, but, as can be seen, it was from one specimen that he drew the description, and Mr. Prout is mistaken. Guenée certainly knew all the forms, and the "6 examples" refers to the other two forms under variety A with blotches on both wings and on the fore wings only. Secondly, Mr. Prout wonders why I believed the form with blotches on both wings to be *enucleata*. Well, simply because I found them so labelled in Packard's collection and figured in the Monograph, and because I knew that Guenée's types were known to Packard, and that they corresponded, I formed this conclusion. I found on reading the description that the two did not agree, but accepted Packard's judgment in preference to my own in this case. I have no doubt that Mr. Prout is correct, and shall accept his judgment regarding my correction, as being in Europe with the Walker types and notes, he is better fitted to pass judgment than I, and I wish to thank him for giving me further information on the subject. Packard, on the whole, made very few mistakes, considering the great amount of work that he did, but on difficult groups like Eois and Eupithecia, one wonders how he could put so many different species under one name, on which I shall comment at another time, and in the case of *enucleata*, this may have been one of his errors.

NOTE ON THE BROWN CRYPTOLECHIA (*CRYPTOLECHIA QUERCICELLA*, CLEMENS).

BY ARTHUR GIBSON, CENTRAL EXPERIMENTAL FARM, OTTAWA.

On several occasions we have observed the leaves of Aspen Poplar tied together by a small yellowish-green caterpillar, but it was not till 1907 that we succeeded in rearing the perfect insect and finding out its name. On August 25th, 1906, I collected a number of these larvæ on *Populus tremuloides* in the Arboretum of the Central Experimental Farm, and was rewarded on June 10th, 1907, by finding that one of the moths had emerged. Soon after that date Mr. W. D. Kearfott, of Montclair, N. J., visited Ottawa, and on submitting the specimen to him, he identified it as *Cryptolechia quercicella*, Clemens. My note taken on Aug. 25th, 1906, reads as follows:

Larva, 12 mm. long. Head shining jet black, wedge-shaped, roughened; clypeus reaching about two-thirds to vertex; mouth-parts brownish. Body pale yellowish-green, with a pulsating dorsal vessel. Thoracic shield blackish, brown in centre of dorsum. Tubercles indistinct, setæ pale. Spiracles round and black. Anal shield blackish. Segment 11 has a few blotches of crimson above spiracles. Feet pale brownish. The larva lives in a tent, which is made by sewing two or three leaves together. These tents are conspicuous on the trees.

In Packard's "Forest Insects," the Brown Cryptolechia is treated of under Insects Injuring Oak Leaves, but Aspen Poplar is also mentioned as a food-plant. The description of the larva there given differs in some respects from that given above of the specimens which I had under observation.

ERRATA.—February number, page 53, last line of second paragraph, for "presence" read "absence"; page 54, 9th line, for "female" read "femora."

PRACTICAL AND POPULAR ENTOMOLOGY.—No. 25.

Oviposition of Epidemia Epixanthe.

BY J. H. COOK AND F. E. WATSON.

A desire to observe the larva of *Incisalia polios* in the field, and to secure a few for breeding, took us to Lakewood, N. J., toward the end of the last week in June, 1907. For forty-eight hours we were compelled to work under the disadvantages incident to a steady rain, succeeded by a series of showers, mists and infrequent periods of half-hearted sunshine. Though no butterflies appeared, such weather was—except for the discomfort entailed—the best possible for caterpillar hunting, and by evening of the second day we had collected a number of *irus*, *niphon* and *polios*, sufficient to warrant us in turning our attention to something else.

A golden sunset gave promise of clearing skies on the morrow, and in casting about for some butterfly problem which might profitably occupy our time, we chanced to think of *Epidemia epixanthe.* It was as yet a little too early to expect the species to be flying in numbers, and our hopes of learning anything of its life-history were correspondingly moderate; nevertheless we made ready for a day's work in the cranberry bogs.

July the first dawned cloudless and serene, and following the less agreeable weather, it seemed doubly pleasant to see the land flooded with light, and to feel the warmth of the morning sun on our hands and faces. We set out betimes along a little-travelled road, which runs through the negro quarter of the village, and on towards the coast. The sandy highway had dried during the night, and walking was slow and somewhat fatiguing, though we made no pretence of haste, stopping occasionally to gather a few *irus* caterpillars from the *Baptisia*,* or to look over the small pines for *niphon.* Further on the road was bordered on either side by thickets of laurel, crowned with magnificent masses of pink and white blossoms, and we paused to admire their luxuriance and beauty, and to enjoy the rich fragrance with which the air was laden. Out in the open, however, we plodded on in full realization that it was a typical, torrid, glorious summer's day.

By reason of slow progress and numerous delays, we did not reach the marsh for which we had headed until well on toward eleven o'clock ;

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*Two weeks before we had discovered a female *irus* ovipositing on *Baptisia tinctoria*, and further investigation has led us to believe that this is the preferred, if not the only, larval food-plant in New Jersey and for some distance southward. Neither eggs nor larvæ were found on lupine *(Lupinus perennis)* either at South Lakewood or Newfoundland, N. J., though they were common enough on the False Indigo wherever *irus* occurred.

but at last the trees thinned on the left, and we crossed a bridge spanning the stream which fed the bog.

The bog began near the road, and for a little distance was on one side overgrown with thick shrubbery, and on the other by small scattering junipers; below this it was clear, save for the cranberry vines, and followed the broad, shallow trough of its sluggish stream until hidden by a turn to the right.

We made for the quaggy ground and separated. Here and there within the radius of vision flashed silvery-gray spots, which when approached resolved themselves into *epixanthe* butterflies, members of a species which for many a year had kept the details of its earlier life a profound secret. Dr. Wm. Saunders had suggested *Menyanthes trifoliata* as the food of the larva, but though the name had remained in mind the plant was not among our vegetable acquaintances. *Rumex verticillatus* had also been mentioned as a possibility by Scudder, apparently because *hypophlœas* and *thoë* fed upon plants of that genus. Cranberry, the most obvious supposition (since *epixanthe* is found only in cranberry bogs), seemed almost out of the reckoning by reason of the repeated failure of those who had sought the larva thereon. Still, failures are not conclusive evidence, and to the cranberry we pinned most of our hopes and all of our females. There were not many of these, though males were quite abundant, and at noon we had but four under gauze.

It was nearly half-past one when the next female was sighted at the edge of the juniper growth. After flitting about for a few minutes, she hesitated above a clump of *Sphagnum*, and fluttered down into the tangle of cranberry vines growing from the moss. Here flight was impossible, and though her wings continued to vibrate rapidly, the motion was evidently indulged in as a means of balancing, progress up and down the young stalks being accomplished entirely with her legs. At length she came to rest so deep among the vines that her position was made out with difficulty ; with half-spread wings she remained for a moment motionless, then buzzed rapidly upward into the net-bag held to receive her.

The egg was soon discovered on the under surface of a new leaf of *Vaccinium macrocarpus* (larger cranberry), about an inch from the end of the branch. As far as we could judge, it did not differ in size, shape or ornamentation from the egg of *Chrysophanus thoë*, though direct comparison was imposssble at the time.

The female was confined over cranberry, and within three minutes oviposited twice. The eggs were placed as in the former instance, upon the under surface of leaves, near the apex of the new shoots, but the branches selected were higher up on the plant, and quite above the *Sphagnum*. Having more confidence in results obtained under natural conditions, we removed the gauze and set the insect at liberty. She flew but a few feet, then settled almost out of sight among the vines, and practically repeated her first performance. Thereupon the lady basely violated the confidence reposed in her by flying for the trees, dodging around one of them, and disappearing most mysteriously. Some time was spent in an endeavour to pick up the lost trail, but without success.

We did not remain at the bog long after this, but returned to Lakewood with our four captive females, and immediately confined them over cranberry arranged as naturally as possible, and put them in a sunny window.

The next day was spent in a small swampy stretch along the railroad track just south of the village. *Epixanthe* was quite abundant, and a dozen or more females were observed, though no eggs were secured. However, a pair were found *in coitu*, and watched for eighteen minutes, when they separated. They were easily taken, and the impregnated female went to join her sisters in prison. We returned to the house about two o'clock, and found one of the insects brought in the day before busily ovipositing on the cranberry. This continued all the afternoon, even on the train bearing us back to New York. Several eggs would be laid at intervals of a few seconds ; then a period of rest would ensue, and again a number of eggs. The last oviposition observed was at 5.30 p. m. The other females taken on July first died without yielding ova.

The female taken just after coitus began to oviposit about ten o'clock on the morning of July 5th, and had extruded all of her eggs by four o'clock in the afternoon. The ova were placed as follows :

	Upper surface.	Under surface.	Calyx.
♀ No. 1, terminal leaf........	1	1	1
lower leaves........	5	32	
Total....................................			40

	Upper surface.	Under surface.	
♀ No. 2, lower leaves	3	39	
Total........			42

Nine leaves had received 2 eggs, six leaves held 3 each, and one held 4. This placing of a second, third or fourth egg on the same leaf is to be regarded as accidental, as is probably the position selected on the flower. None of the eggs were placed more than three inches from the end of the stem, and none were laid on the stem itself.

On the 14th the junior author was at Lakehurst, N. J., and was fortunate enough to again observe a ♀ *epixanthe* ovipositing in nature on the large cranberry. The act was performed in a manner similar to that already described. Other females taken on the same date, when confined in glass jars laid a few eggs, placing them in the ordinary position on the under side of leaves within a short distance from the end of the shoot.

We expected the eggs to hatch any day, but when July and August passed without any sign from the hundred-odd examples, it became evident that the insects would winter in this stage.

It is not an easy matter to carry living eggs through the period of hibernation under the most favourable circumstances, and despite such precautions as have been taken, our total ignorance of the conditions necessary to ensure the well-being of the tiny larvæ still within the shell, may be responsible for the loss of the entire lot. We were, therefore, glad to avail ourselves of the assistance of Mr. C. A. Frost. There is a bog about a mile from his home, at South Framingham, Mass., in which he sought for eggs on the cranberry vines, as we had found them, and met with exceptional success. On October 5th we received twelve eggs collected by him in two and a half hours. One of these was on a piece of dried fern, but all others were in the usual position on the leaves. At our suggestion Mr. Frost located more eggs, marking the plants so that it would be possible to find them again in the spring. Under date of Oct. 27th, 1907, he wrote :

"I have to-day located ten eggs on the bog, and marked them as you explained to me. They were all on leaves one inch or less from the top of the stems. One was located where there was a growth of Sphagnum moss, but it was as high as the rest All the eggs so far have been near or on the edge of the bog ; I have not looked very much toward the centre."

Should the eggs now hibernating under artificial conditions fail to hatch, we rely on those "marked for future reference" to give their larvæ normally ; and with Mr. Frost's able assistance we may be so fortunate as to work out the rest of the life-history of this interesting species before another egg-laying season arrives.

A NEW GALL ON ASTER.

BY T. D. A. COCKERELL, BOULDER, COLO.

Early in October, 1907, I collected a quantity of *Aster crassulus*, Rydberg, in Boulder, for the use of the biology class of the preparatory school. A student, Milton Bergheim, observed that it carried galls, which I had inexcusably overlooked. Once noticed, it was easy to find more; in fact, the plants swarmed with them. On opening them the flies were found to be in the pupa stage, and so were easily bred out a few days later. The species is undescribed.

Cecidomyia crassulina, n. sp.

♂.—Length, 1⅔ mm.; of wing, 1⅔ mm.; middle legs a little over 3 mm.; head small, transverse diameter about 357 μ, eyes meeting on vertex. Reddish-brown, the abdomen paler and grayer, the sides of the thorax orange; legs and antennæ pale gray-brown; halteres orange. Antennæ moniliform, with 19 (2 + 17) joints, these with whorls of hairs about 204 μ long. Wings very hairy; hairs on lower margin about 170 μ long; first vein (R_1) about 1360 μ long; second (R_{2+3}) reaching tip of wing; third (cubitus) distinct only as far as the fork, which is almost exactly half way between base and apex of wing. Claws strongly curved, simple. Claspers with apical joint finger-like, strongly curved, obtuse, thickened at end.

Measurements of legs in μ:

Anterior legs: femur, 1088; tibia, 1207.

Middle legs: femur, 1088; tibia, 1071; tarsal joints, (1) 85; (2) 867; (3) 374; (4) 204; (5) 102.

The antennæ are much like those of *Dasyneura pseudacaciæ*, except as to the number of joints, but the venation is quite different, the second longitudinal being curved and ending much lower down. The terminal joint of the claspers is something like that of *C. salicis-batatas* (Ckll., Entomologist, 1890, p. 278), but much more curved and thickened at end. It is more like that of *Diplosis violicola*, Coq. The flies emerged October 11.

The galls are sessile on the branches, often two placed side by side. They are short-oval, about 7 mm. long, densely covered with white hair, looking something like small green peaches.

March, 1908

FOSSIL CHRYSOPIDÆ.

BY T. D. A. COCKERELL, BOULDER, COLO.

Only six species of Chrysopidæ (Lace-wing Flies) are known in the fossil state. Two of these, from Europe, have only been vaguely reported as *Chrysopa* sp.; the other four, named by Scudder, are all from the Miocene shales of Florissant, Colorado. It is even probable that the Florissant species represent all that is known of extinct Chrysopidæ; because the two European forms, according to Scudder and Hagen, are of an extremely dubious character, and very likely not Chrysopidæ at all.

Scudder refers the Florissant species to two extinct genera, and it is very interesting to find that both of these belong to the *Nothochrysa* section, with the third cubital cell divided longitudinally into two subequal parts. The genus *Nothochrysa*, McLachlan, is to-day represented in this country by a single species, *N. Californica*, Banks, found in California. Of the same section, but with the colours of *Chrysopa*, is the genus *Allochrysa*, Banks, with two or three species of the States bordering the Atlantic. These forms seem to give way to-day to the dominant *Chrysopa*; but in Miocene times they evidently prospered, and it is likely that *Chrysopa* had either not been evolved, or had not reached this country. A specimen found by my wife at Station 14, Florissant, is referable to *Tribochrysa vetuscula*, Scudder, and shows the apical half of the wings, which was missing in Scudder's type. It is evident from the more complete material that this species cannot go in *Tribochrysa* (the type of which is *T. inequalis*, Scudd.), but allowing for the inaccuracy of Scudder's figure of *Palæochrysa*, as explained in the text (Tertiary Ins. N. Am., p. 167), I think it may fairly be referred to the latter genus, not without a shadow of a suspicion that it is even conspecific with *P. stricta*, Scudd.

The following details supplement Scudder's description:

Palæochrysa vetuscula (Scudder).

Anterior wing, 13½ mm. long; veins dark, as in *Nothochrysa*; the subcosta does not terminate on the margin, as Scudder describes for *Palæochrysa*, but runs through the stigma, as in *Mantispa*; 14 costal cells, not counting a series of minute ones at the apical end; 10 cells between media and radial sector, counting the two long basal ones; 20 cells between radial sector and radius (in Scudder's figure of *vetuscula* the first cross-nervure is omitted); 11 cells between media and cubitus, after the double cell; six branched nervures from cubitus to lower margin, all in apical part of wing. The media has a direct course, without the bend of *Tribochrysa*.

In the table given by Mr. N. Banks (Trans. Am. Ent. Soc., 1903, p. 142), the genus comes in as follows :

Venation dark.......... .... 1.

Venation mainly green ; veinlets on outer and posterior margins of wings forked ; third cubital cell (double cubital of Scudder) with normally two branches to hind margin.........*Allochrysa*, Banks.

1. Veinlets on outer and posterior margins of wings mostly simple ; third cubital cell with only one branch to hind margin..............................*Nothochrysa*, McLach.

Veinlets on outer and posterior margins of wings largely forked ; third cubital cell with two veins running to hind margin..............................*Palæochrysa*, Scudder.

NOTES ON COLEOPTERA.

BY W. KNAUS, MC PHERSON, KANSAS.

Cotalpa subcribrata, Wick., was fairly common the last two weeks in May and the first half of June, 1907. On willows in the sand hills near Medora, Kansas, in Reno County. During the day they were found clinging to twigs and foliage of scrub willows. I have seen this species, or subspecies, from Central Kansas west, from western Nebraska, and from Colorado, near Fort Collins.

Anthaxia viridicornis, Say, I took for the first time in twenty-five years' collecting in Kansas last June on willows near Medora. Three specimens only were taken.

A new *Charistena* near *ariadne*, Newm., but markedly distinct from that species in the shape of the thorax and other characters, was beaten from willows near Medora the first week in June, 1907. Three specimens were taken. I had never seen the species before, although the same ground had been collected over by me for the past twenty years.

Glaresis inducta, Horn, was taken at light one evening in July, 1907, in McPherson ; but one specimen was secured differing slightly from typical specimens of the species. This record extends the range of the species much to the northward, the previous northern record having been near Fedor, Texas.

Specimens of *Cicindela marginata*, Fab., and *togata*, Laf., were received during the past season from Mr. H. P. Loding, taken near Mobile, Alabama ; this is a new locality for this species.

A fine male specimen of *Xylophilus (Emmelinus) Ashmeadi*, Csy., taken near Mobile, was also sent to me by Mr. Loding. The species was described from Florida.

Nathicus virginæ, Csy., is a pretty Anthicid recently sent me by Mr. Loding, from near Mobile. The type was described from Fortress Monroe, Va.

While collecting in the Sacramento Mountains, near Cloudcroft, N. M., last June, I secured a number of specimens of an undescribed species of Pselaphidæ belonging to the genus *Euplectus*. They were found on the inner surface of pine bark stripped from stumps. The specimens are of the same colour as the inner bark, and are difficult to detect when collecting. I also secured a single specimen of an *Actium*, also undescribed. It was found in a Scolytid burrow under pine bark.

A flowering shrub with long catkins of pink and white flowers near Cloudcroft attracted hundreds of specimens of an Aleocharinid last June. The species is near *Platandria mormonica*, Csy., but Maj. Casey pronounces it a new species differing chiefly in sexual characters. Hundreds of specimens could be taken by inserting the catkins carefully in the cyanide bottle, when a slight shake would send the beetles to the bottom of the jar.

On three collecting trips to the Sacramento Mountains of N. M., near Cloudcroft, previous to my trip of last June to the same region, I had taken one or two specimens of that curious little Pselaphid recently described by Mr. Charles Schæffer, of the Brooklyn Museum, as *Fustiger Knausii*. The past season, however, I was more fortunate, and secured a fine series of this rare species. They occurred in the nests of a rather small, dark-coloured ant, of the genus *Lasius*, probably *americanus*, although one or two were found in the nest of a similar coloured but smaller ant. These nests were on the summit, at an elevation of nine thousand feet, and were found under stones. Only a small per cent. of the ant colonies were inhabited by *Fustiger*. Occasionally one, more often two, three or four, were found. My best catch was eighteen specimens with one colony of *Lasius*. The light reddish colour and slow movements of *Fustiger* allow them to be seen and taken easily. When disturbed the colony of ants pays no attention to the beetles, but at once begins to carry away the larvæ and pupæ. Only in one instance was an ant seen to seize a *Fustiger*. On being captured it refused to release its victim, was transferred to the cyanide bottle, and after death it was necessary to sever the thorax of the *Fustiger* to release it from the mandibles of the ant.

NOTE ON GABRIOLA DYARI, TAYLOR.

BY GEO. W. TAYLOR, WELLINGTON, B. C.

This species was described by me[1] from a male specimen only, and no females have yet been discovered.

Dr. Dyar, after examining the Hulst collection, expressed the opinion[2] that the single type of *Nacophora minima*, Hulst, in that collection was conspecific with the male *Dyari*, and that therefore my species would fall.

Lately[3] Mr. Grossbeck has expressed the same opinion.

A short time ago, however, I had the pleasure of seeing the type specimen of *N. minima* myself, and noted some differences; and subsequently on going through the fine collection in the U. S. National Museum, I was pleased to find two male specimens which agreed exactly with my note of *minima*, and showed clearly the validity of *G. Dyari.*

This species will therefore stand, and Hulst's species, which is not a *Nacophora* (as it lacks the tongue that should be present in that genus), must be known as *Gabriola minima.*

The two males just mentioned are labelled respectively "Arangie, Idaho," and "Glenwood Springs, Colo., Aug. 1–7," agreeing in locality with *G. minima.*

G. minima may be distinguished from *G. Dyari* by the very straight intradiscal line, that line in *Dyari* being well rounded out. The prevailing tint in *Dyari* is a warm brown, while in *minima* it is dull gray, and the white blotch at the anal angle of the fore wing, so conspicuous in *Dyari*, is absent.

A REPLY TO DR. DYAR.

BY EVELYN GROESBEECK MITCHELL, WASHINGTON, D. C.

I have been deeply gratified at the many favourable reviews and comments which my work, "Mosquito Life," has received. In Dr. Dyar's review, he not only seems unable to say anything against it, but, on the other hand, to so admire it. that he has become possessed of the strange idea that he is actually the author of some portion of it, since he says that he has to turn to the title page to ascertain whether or not it is his own. This, as well as other deplorable notions, he has seen fit to set forth in print. I shall endeavour to dissipate these vagaries in the order in which he has expressed them :

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[1] CAN. ENT., XXXVI, 255.

[2] Proc. Ent. Soc. Wash., VI, 226.

[3] Ent. News, XVIII, 151.

1. I have had no help whatever from Dr. Dyar in the preparation of my book, or in that of my thesis, except in the one instance regarding the latter, acknowledged below.

2. As for Mr. Coquillett, if Dr. Dyar intends to say that that gentleman wrote or dictated any portion of my book, Dr. Dyar is stating what he knows to be an absolute untruth. The book was written at my home in New Jersey, and Mr. Coquillett never saw it until I had everything settled with the publishers. If I have not given sufficient credit to any one, it is to Dr. H. A. Morgan, who, when I asked him exactly what part he had taken in the work at Baton Rouge before I came, answered, with his characteristic modesty, that he would prefer to remain unmentioned rather than risk detracting in any way from the credit due Dr. Dupree. In fact, one of the readers of the manuscript remarked that I gave more credit than necessary.

3. If my book "reads like a second edition of Dr. Howard's," the latter would have to be entirely rewritten and largely extended. At present, beyond treating of the same general subject, I fail to see any comparison in plan, style or text. In fact, I purposely passed lightly over some subjects, such as the experiments in Cuba, because they were fully enough treated in Dr. Howard's book, and said so (Mosquito Life, p. 105). I have certainly credited him wherever I quote him and have referred to his book as "admirable." I found no necessity for quoting any biological notes from Dr. Dyar, though I have quoted Mr. Knab. I do not agree with Dr. Dyar's systematic work, and devised my keys after my own plan. I adhere to Mr. Coquillett's classification because I preferred to adopt one that is sane, scientific and likely to remain permanent

4. I treated of the biology of all United States species so far as known up to the time of my receiving galley proof.

Other species whose habits were unknown, I mentioned by name and distribution. The western species are mostly thus treated ; naturally, this was unavoidable. Species founded on larvæ only, I purposely omitted.

5. There *are no* descriptions of larvæ in the text. There are a few general references to superficial appearances, from which alone it would be absolutely impossible to identify the larva with certainty. These references may correspond to Dr. Dyar's idea of a proper description, although they are, as should be plain to the reader, not so intended. Possibly he refers to the keys. I submit here my "description" of *pipiens*, the common house mosquito, as an example, for comparison with that which he gives of the same species in his article on Culicid larvæ as independent organisms (Journ. N. Y. Ent. Soc., Dec., 1906, p. 206). To ensure entire comparison, I begin with his generic key. I do not need to quote from mine, as my larva-table runs to specific and generic names combined ;

DR. DYAR.—GENERIC KEY.

Couplet 1. Mouth brush vibratile, diffusely folded inward.

4. Air tube long [how long is a piece of string?], the hairs in scattered tufts or absent, the antennæ usually with the tuft beyond the middle away from a notch.

5. Anal segment without hairs before the barred area.

6. Lateral comb of the eighth segment of many scales in a triangular patch.

SPECIFIC KEY.

1. Antennæ with the tufts outwardly placed, the part beyond slender.

5. Air tubes four times as long as wide or over.

7. Anal appendages 4, normal.

8. Air tube with 4 paired tufts posteriorly outwardly, sometimes increased by additional ones basally, the subapical one moved laterad, out of line, usually situated at the outer third of the tube.

14. Air tube less than five times as long as wide, the sides curved, tapering rather rapidly after the middle, subfusiform.

17. Air tube 5 x 1 [N.B. The tube seems to grow between 14 and 17!], pecten teeth about 15, subdorsal hairs of abdominal segments 3 and 4 double.

MY LARVA KEY.

1. Tube well developed, tube-like. *Long thoracic tufts present.*

9. Chitin of head not produced laterally, *posterior portion of mandible never produced or visible from above.*

10. *Anal gills never three times as long as tube, never with more than four distinct constrictions.*

11. Mouth brushes of slender hairs, directed forward. *Antennæ situated far forward.*

17. Tube with more than two tufts.

18. Antennal tuft in notch and *having 10–30 hairs, usually over 15.* Pecten extending less than half way up tube, not more than two teeth separated.

19. Body and head with no noticeable pilosity.

20. Scales of comb in more than two rows. Tufts of tube not plumose.

22. Antennal tuft beyond middle, tube with tufts.

23. *Group of hairs nearest meson in thoracic row, one of three long single hairs.* Tufts of tube mostly of two to four hairs.

24. Tufts on tube 4, the penultimate one more laterad, tube tapering decidedly on the last half. *Terminal spines of antennæ not very long, not over one-half length of antennæ. Head tufts not projecting much, if at all, beyond forward margin of head. Tips of antennæ and spines of but slightly heavier chitin than base of antennæ.*

The other "descriptions" will be found to vary quite as widely from Dr. Dyar's. Length, as compared to width of tube, appears to be one of his favourite characters, and is absolutely undependable in skins, especially when such a close distinction as that between 5 x 1 and 4 x 1 must be drawn. Against this I protest in my book, as also against a too extensive use of another of his favourite characters, the number of comb scales (pp. 16 and 17). The italicised characters in my "description" he *never* uses. I have made large use of the number of hairs in certain tufts on the head, while he rarely notices the tufts at all.

6. Mr. Knab (who is certainly a fine artist) must have conveyed his criticisms to me by telepathy, with the additional obstacle of our being unaware of each other's existence. All my drawings, save *O. bimaculatus*, plate III, the mouth-parts of some of the *Uranotænias* and the egg of *L. squamiger* were made in Louisiana long before I came to Washington. The exceptions mentioned were made in Washington from specimens sent by Dr. Dupree for that purpose, save the *bimaculatus*, which I made in pencil for a nature-study article from a specimen given me by Dr. Dupree, who also gave me permission to publish as I pleased. I made a somewhat similar wash-drawing of this species for the Monograph. At no time has Mr. Knab supervised or corrected my drawings.

7. I fail to see how I could have "absorbed a large amount of information" from the Museum (not Carnegie) collection of larvæ, on which I was at first set to work.

I have worked on very few of the species belonging to the actual Carnegie collection. Be it observed, that my work, outside the keys, is wholly biological as contrasted with Dr. Dyar's "systematic" work, and could not possibly be derived from dead specimens. At no time have I had access to any of Dr. Dyar's or Mr. Knab's notes, and I have never even seen any except as they appeared in print.

8. As to the keys themselves. When I began drawing I had, as stated in my Introduction, keys covering the Louisiana forms. I was encouraged to extend these, and no objection was made to my using them as a thesis, which I plainly said I expected to publish. When I wished to do so, however, opposition was made on the ground that "everything in the larva key outside the Louisiana species was Carnegie." Now, some had been collected in the District of Columbia and in New Jersey by myself, some sent to me, and for the rest I had been careful to use only what I was informed was the Museum study collection, to which, as a George Washington University student, I had right of access, except in

the case of *D. cancer* and *O. Mitchellæ*, which Dr. Dyar most magnanimously and generously loaned me for the purpose. I made acknowledgment to the Museum in my thesis.

Five United States species out of 26 northern species (which include my own material as mentioned above), proved to be Carnegie, and two were doubtful. Some West India species proved to be thus classed, and I have omitted all West India or other extralimital forms entirely. I was informed that "if I reworked my keys from other specimens there would be no objection," but that "I might find some difficulty in so doing." I therefore went to the New Jersey and New York State collections, entirely reworked and radically changed my keys, and had the advantage of better series of specimens, also several species not found at all in the National Museum collection, as well as those which were in the latter collections. Please note, Dr. Dyar's keys, including all the Museum and the Carnegie species said to be in my keys, were published long before I began to rework my keys; that I publish no new species at all, and "describe" no larvæ not already published by Dr. Dyar or some one else. My only crime seems to be that I have founded keys mainly on characters of which he makes little or no use, and presume to differ from his ideas and evolve a few of my own. This is the first time I am aware that I was supposed to have any connection with the Monograph beyond drawing for it. Although Dr. Dyar did occasionally request me to differentiate species when he could not, I never made agreement to do such work. One would naturally suppose that such work would be done by the "expert" himself, inasmuch as he assumes the credit for it.

9. As for "redrawing figures after office hours," I have already stated where and when my figures were drawn. Further, Dr. Dupree neither sold nor gave the drawings made for him to the Carnegie Institute, but merely *lent* them, with the understanding that I should copy them for the Monograph and be paid for my time. He reserved the right of first publication. He never took a cent from the Institute, because he wished to publish independently. I have not copyrighted any drawings made for the Monograph, only the originals made for Dr. Dupree from his specimens. The fact that drawings are copyrighted of which copies were made for the Monograph does not hinder Dr. Dyar from the publication of these copies. To be sure that it would not, I have plainly indicated in my Introduction that I expected them to be published in the Monograph (p. XIX.). I have no doubt that Dr. Dyar would have liked to prevent the publication of my book, but evidently could not. He certainly knew that I was at work on one, since I am told that the Duprees were requested, shortly after the

Doctor's death, to turn over his notes for the Monograph and refused on the ground that the material was already promised to me. Mrs. Dupree wrote to me : " In regard to getting out the book, I don't think anybody could do it as well as yourself." Since Col. Boyd, President of the Louisiana State University, and Prof. H. A. Morgan advised her to send the notes to me, I think there can be no question as to how I " acquired " them.

I feel rather flattered at the comparison to Psorophora, since this insect is large, beautiful, not a frequent nuisance, but an exterminator of common and pestiferous "Ædids." However, I must admit that when it bites, it bites hard.

I deeply regret the departure from facts upon Dr. Dyar's part, which has necessitated this reply. Since personalities are not science and have no place in scientific publications, I have, although sometimes under great provocation, hitherto passed over all personal attacks. This time I do not see how I can honourably remain silent.

NOTES ON THE LEPIDOPTERA OF KASLO, B. C., WITH DESCRIPTIONS OF SEVEN NEW SPECIES.

BY GEO. W. TAYLOR, WELLINGTON, B. C.

(Continued from page 60.)

7. *Sciagraphia purcellata*, n. sp.—It is a dangerous proceeding, I am afraid, in the present stage of our knowledge, to describe a new species of *Sciagraphia*, but as I cannot find any published description to fit the present form, and as it comes from a locality possessing many peculiar species, I have, after comparing it with long series of its nearest allies, ventured to give to it a distinct name.

Mr. Cockle has shown me three specimens, which I have labelled as types. They were all taken by him in the neighbourhood of Kaslo, and are dated 7th July, '07 ; 3rd August, '02, and 15th August, '01. The first and last named, which are both females, are in my own cabinet, the other one remains with Mr. Cockle.

Mr. Cockle tells me that a similar specimen taken much earlier in the year was named for him at different times as *S. nubiculata*, *S. punctolinearia* and *S. subacuta* (see Lep. Koot., p. 906), but I am of opinion that all these determinations are erroneous, and that these names should all be removed from our list. *S. purcellata* may be described as follows :

Expanse, 25 mm.

The ground colour of the wings and abdomen is like that of *S. granitata*, and I think that I should probably have passed over *purcellata* as a small race of *granitata* but for the fact that the last named is a very common insect at Kaslo, normally very large and dark, and not appearing to intergrade in any way with the species under discussion.

The head and collar in *purcellata* are tinged with ochreous, the abdomen is grayish, with faint brown twin spots dorsally, and by this last character *purcellata* can be distinguished readily from the species of the *heliothidata* or *californiata* groups, all of which have the abdomen unspotted.

The fore wing is crossed by the usual three lines, but they are firmer and less wavy than is usually the case in *granitata*; this is especially noticeable in the extra-discal line.

Beyond the extra-discal line is a broad and distinct dark shade, which includes and obscures the dark blotch between veins 3 and 5.

The dark shade is followed outwardly by a rather distinct white line. The marginal line of blackish spots, generally so well marked in *granitata*, is hardly visible.

The hind wing is heavily speckled with darker gray, and an irregular line is traceable as in *granitata*.

The discal spots on the fore wings are obsolete, and on the hind wings are very small and faint.

Beneath, all the wings are speckled and mottled with ochreous, and on the fore wing there is a median line and an extra-discal band of the same colour, each bordered outwardly by a broken white line.

On the hind wings there are also two lines, median and submarginal, quite distinct. The discal dots on all the wings are minute.

It will be seen that *purcellata* is most nearly allied to *granitata*, but I think that the small size, the plainer and more regular markings, and the other slight differences noted above, will serve to distinguish it.

In order to make this paper more complete as a supplement to the Geometrid portion of Dr. Dyar's excellent "Lepidoptera of the Kootenai District of British Columbia" (Proc. U. S. Nat. Mus., XXVII, 779–938, 1904), I append a list of the corrections and alterations, which, after the study of more abundant material than Dr. Dyar possessed, I think should be made in the nomenclature of the species noticed in that paper.

It must not be thought that all these are cases of misidentification on the part of Dr. Dyar, for in many instances they are simply restorations of older names brought to light since the publication of his paper.

Tephroclystis laquœaria, H. Sch., should be *Eupithecia albicapitata*, Packard.

T. absinthiata, Clerck, should be *E. coagulata*, Gueneé.

T. satyrata, Hubner, should be *E. perfusca*, Hulst.

T. laricata, Freyer, should be *E. perbrunneata*, Taylor.

T. multistrigata, Hulst, should be *E. Dyarata*, Taylor.

Eucymatoge grandis, Hulst, should be *Eucymatoge Græfii*, Hulst.

E. linariata, Fab., should be *E. tenuata*, Hulst.

Venusia 12-lineata, Pack, should be *Euchœca Pearsalli*, Dyar.

Eustroma populata, Linn., should be *Eustroma propulsata*, Walker.

Mesoleuca cæsiata, D. and Schif., should be *Eutephria multivagata*, Hulst.

M. albolineata, Packard, equals *M. silaceata*, Hubner.

Hydriomena tæniata, Stephens, should be *Hy. basaliata*, Walker.

Triphosa progressata, Walker, should be *T. hæsitata*, Gueneé.

Cosymbia lumenaria, Hubner, should be *C. pendulinaria*, Gueneé.

Eois rotundopennata, Pack., should be *E. Hanhami*, Hulst.

Synchlora rubrifrontaria, Pack., should be *S. liquoraria*, Gueneé.

Aplodes rubrifrontaria, Pack., equals *A. Darwiniata*, Dyar, a good species, var. *Darwiniata.*

Deilinia erythemaria, Gueneé, should be *D. pacificaria*, Pack., a good species, var. *pacificaria*, Pack.

Deilinia quadraria, Grote, should be *Ixala desperaria*, Hulst.

D. rectifascia, Hulst, equals *D. fœminaria*, Gueneé.

D. litaria (Dyar, not Hulst), equals *D. falcataria*, Pack.

D. variolaria, Gueneé, should be *Diastictis Hulstiaria*, Taylor.

Sympherta tripunctaria, Pack., equals *S. lorquinaria*, Gueneé.

Nepytia umbrosaria, Pack., should be *Enypia Packardata*, Taylor.

Selidosema humarium, Gueneé, equals *Cleora emasculatum*, Dyar, a good species, var. *emasculatum*, Dyar.

Melanolophia canadaria, Gueneé, equals *Mel. limitata*, Walker, var. *subgenericata*, Dyar.

Metrocampa prægrandaria, Gueneé, should be *M. perlata*, Gueneé.

Metanema textrinaria, Grote and Rob., equals *M. quercivoraria*, Gueneé.

In the foregoing list, whenever the two words are connected by the word *equals*, it signifies that the first name is a synonym of the second. When the expression "should be" is used, it means that the first name does not apply to the Kaslo species, but to a different insect.

THE MATING OF BOREUS CALIFORNICUS.

BY J. W. COCKLE, KASLO, B. C.

The habits of these insects, which are found travelling over snow in winter, present many curious features, amongst them being the fact that cold seems to have little effect on them. I have collected them on the snow when the temperature showed several degrees of frost, but even at this low temperature they would be capable of motion. They are usually very lively when the temperature is just above freezing point, and when the snow is deep in the woods and a slight thaw is commencing is the most favourable time at which to go out collecting. This afternoon, Jan. 26th, whilst travelling along a road through the timber, I picked up several specimens, and transferred them to a box in the hope of shipping them to Dr. Fletcher, who was desirous of seeing specimens of them alive. Having secured several, on the way back home I noticed a specimen which appeared to have something on its back, which, on closer observation, proved to be a pair in copulation; the day was cloudy, and the temperature had held at just the freezing point all day, but at this time a change was coming over the snow and a slight thaw was setting in. It is probable that the temperature at the time I noticed them was below 33 degrees. As I have collected large numbers of these insects, and this was the first occasion that I had seen a pair together, I took occasion to examine them closely. I had with me only a small pocket-lens with a three-quarter-inch focus, and in order to observe them through this I was compelled to lie down on the snow. Such a position, it can readily be understood, was not particularly favourable for an extended study. The female was riding on the back of the male, her front legs folded up in the position of kneeling, the second pair resting on the back of the male, whilst the much elongated third pair hung down below the abdomen of the male; the ovipositor was released from the sheath, which remained in its normal position, whilst the ovipositor itself was thrust down perpendicularly into the organs of the male. The male presented a very extraordinary feature, the embryonic wings, which are curved at the tips, were extended and hooked over the tibiæ of the kneeling female, thus holding her in an upright position on the back when he moved about.

The fact of the wings being used as an aid in holding the female during copulation, may be possible with other insects, but this is the first instance which has come under my observation where they have been put to such a use.

My recumbent position in the snow being very unpleasant, I picked up the pair with my forceps, and transferred them to a box, but as they immediately separated, further observations were suspended.

NOTES ON NOCTUIDÆ.

Collected by Mrs. M. D. Nicholl, in Alberta, British Columbia, and the Washington Forest Reserve, in the years 1904-5-7.

BY SIR G. F. HAMPSON, BT., B.A., ETC., BRITISH MUSEUM, LONDON, ENG.

The numbers given are those in Dyar's Catalogue of N. American Lepidoptera, and only the more local and interesting species are referred to. The specimens are in the British Museum.

AGROTINÆ.

2407. *Heliothis vaccinia*, H. Edw.

B. C., 1905, Upper Skagit, 1 ♀. U. S. A., 1905, Robinson, 1 ♀; Washington Forest Reserve, 1905; Washington Pass, 1 ♂, 1 ♀; Horseshoe Pass, 1 ♀.

2405. *Heliothis honesta*, Grote.

B. C., 1905, Upper Keremeos, 1 ♂; Pasayten, 1 ♂.

1767. *Agrotiphila maculata*, Smith.

Alberta, 1907, Mt. Athabasca, 3 ♂'s, 2 ♀'s; 1905, Laggan, 1 ♂. B. C., 1904, Lake O'Hara, 1 ♀.

1764. *Orosagrotis incognita*, Smith.

Alberta, 1907, Brobokton Creek, 1 ♂.

1560. *Porosagrotis orthogonia*, Morr.

Alberta, 1907, Prairie, 1 ♂.

1734. *Euxoa colata*, Grote.

Alberta, 1907, Wilcox Peak, 1 ♂.

1732. *Euxoa nordica*, Smith.

Alberta, 1907, Kootenay Plains, 1 ♀.

1431. *Episilia littoralis*, Pack.

Alberta, 1907, Kootenay Plains, 4 ♀'s.

1417. *Aplectoides speciosa,* Hübn., var. *arctica*, Zett.

Alberta, 1907, Wilcox Pass, 1 ♂.

Protagrotis Nichollæ, n. sp.—Head, thorax and abdomen brown, mixed with gray-white; tarsi with slight pale rings. Fore wing fuscous-brown, mixed with gray-white; sub-basal line represented by slight dark marks below costa and cell; antemedial line dark, defined by white on inner side, erect, angled outwards in submedian fold and above inner margin and inwards on vein 1; claviform slightly defined by blackish at extremity ; orbicular represented by some white scales ; reniform defined by white on outer edge, otherwise undefined ; a very indistinct sinuous dark medial line ; postmedial line indistinct, dark, slightly defined by whitish on outer side, bent outwards below costa, then dentate, incurved below vein 4, some white points beyond it on costa ; subterminal line whitish, slightly defined by fuscous on inner side, waved, excurved below vein 7, angled inwards in discal fold, and incurved below vein 3 ; a slight dark terminal line ; cilia fuscous, intersected with whitish. Hind wing grayish, nearly uniformly suffused with fuscous-brown ; a slight dark discoidal lunule ; cilia white, with a slight brown line through them ; the under side whitish, irrorated with fuscous-brown, a slight discoidal lunule, indistinct sinuous postmedial line and diffused subterminal line.

Alberta, 1907, Wilcox Pass, 3 ♀'s ; Brobokton Creek, 1 ♀. B. C., 1904, Simpson R., 1 ♂ type ; Glacier, 1 ♀. Expanse, 44 mm. In the collection of Prof. J. B. Smith is a specimen from Washington, Mt. Ranier, which, he informs me, is much brighter in colour.

HADENINÆ.

1936. *Anarta impigens*, Wlk.

Alberta, 1907, Wilcox Pass, 2 ♂'s ; Brobokton Creek, 2 ♂'s. B. C., 1904, Simpson R., 1 ♂.

Anarta Staudingeri, Auriv.

Alberta, 1907, Brobokton Creek, 4 ♀'s.

1935. *Anarta Richardsoni*, Curt.

Alberta, 1907, Wilcox Pass, 1 ♂, 2 ♀'s; Mt. Athabasca, 3 ♂'s.

1931. *Anarta melanopa*, Thubg.

Alberta, 1907, Wilcox Pass, 2 ♀'s ; Mt. Athabasca, 3 ♂'s, 6 ♀'s ; Brobokton Creek, 3 ♀'s. B. C., 1904, Okanagan, 2 ♂'s, 1 ♀; 1905, Ashnola, 1 ♀. U. S. A., 1905, Washington Forest Reserve, Upper Skagit, 3 ♂'s, 1 ♀.

1915. *Lasiestra phoca*, Möschl.

Alberta, 1904, Lake Louise, 1 ♂, 1 ♀; 1907, Mt. Athabasca, 3 ♀'s; Sheep Mt., 1 ♀; Brobokton Creek, 1 ♂, 1 ♀. B. C., 1904, Kicking Horse Pass, Yoho Peak, 1 ♀; Mt. Assiniboine, 2 ♀'s; Lake O'Hara, 1 ♀.

1910. *Lasiestra uniformis*, Smith.

B. C., 1904, Mt. Assiniboine, 1 ♀.

Lasionycta Rainieri, Smith.

B. C., 1904, Kicking Horse Pass, Yoho Valley, 1 ♂.

1998. *Miselia ingravis*, Smith.

Alberta, Wilcox Pass, 1 ♀. B. C., 1907, Vancouver I., Cowichan Lake, 1 ♂.

Miselia carbonifera, n. sp.—♀. Head, thorax and abdomen fuscous-black, mixed with some gray; frons with black bar above; tarsi slightly ringed with white. Fore wing fuscous-black, irrorated with gray; sub-basal line represented by diffused black striæ from costa and cell; antemedial line slight, black, somewhat sinuous and oblique; claviform small, defined by black; orbicular slightly defined by black and irrorated with whitish, irregularly rounded; reniform indistinctly defined by black, its annulus represented by a white line on outer side, curved inwards at lower angle of cell; postmedial line very indistinct, black, defined on outer side by some white scales towards costa, bent outwards below costa, then dentate, excurved to vein 4, then incurved, some white points beyond it on costa; subterminal line represented by some white scales defined on inner side by black lunules, slightly excurved below vein 7 and angled outwards at veins 4 and 3; a terminal series of slight black lunules; cilia intersected by whitish at the veins. Hing wing fuscous-black, mixed with gray; a fine black terminal line; cilia whitish, mixed with black; the under side with faint blackish discoidal spot and indistinct diffused curved postmedial line.

Alberta, 1907, Wilcox Pass, 2 ♀ type. Expanse, 50 mm.

There is a worn female of a closely-allied unnamed species in the British Museum from N. Siberia, Yerkhoiansk, it appears to be most nearly related to *M. mystica*, Smith.

CUCULLIANÆ.

Eumichtis maida, Dyar.

B. C., 1904, Glacier, 1 ♀.

Sympistis Zetterstedti, Staud.

Alberta, 1907, Mt. Athabasca, 1 ♂. B. C., 1904, Kicking Horse Pass, Yoho Valley, 1 ♀.

The specimen recorded as *S. lapponica* in Cat. Lep. Phal., VI, p. 416, belongs to this form.

Var. *labradoris*, Staud.

Alberta, 1904, Lake Louise, 1 ♂, 1 ♀; 1907, Mt. Athabasca, 1 ♂, 1 ♀; Wilcox Peak, 1 ♂. B. C., 1904, Lake O'Hara, 1 ♂, 1 ♀; Mt. Assiniboine, 1 ♂.

Sympistis coclei, Dyar.

Alberta, 1907, Brobokton Creek, 1 ♀.

Closely allied to *S. funesta*, Payk., and not a *Homohadena*.

ACRONYCTINÆ.

2260. *Calamia tranquila*, Grote, var. *viridula*.

U. S. A., Washington Forest Reserve, 1905, Early Winter Creek, 1 ♀.

2423. *Eutrichopis nexilis*, Morr.

B. C., 1904, Lake O'Hara, 1 ♂; 1907, Sheep Mt., 1 ♀. U. S. A., Washington Forest Reserve; 1905, Washington Pass, 1 ♀.

CATOCALINÆ.

2761. *Drasteria annexa*, H. Edw.

Alberta, 1904, Banff, 1 ♀.

2755. *Drasteria crassiuscula*, Haw.

B. C., 1904, Greenwood, 1 ♂, 1 ♀; L. Okanagan, Penticton, 2 ♀'s, 1905, 1 ♂; Ashnola, 2 ♂'s, 2 ♀'s; Up. Keremeos, 1 ♀.

PLUSIANÆ.

2492. *Plusia Californica*, Speyer.

Alberta, 1907, Bear Creek, 1 ♀. B. C., 1905, Ashnola, 3 ♀'s.

2526. *Plusia speciosa*, Ottoleng.

B. C., 1905, Pass D. Hope, 2 ♂'s. Identified by Dr. Ottolengui.

2502. *Plusia octoscripta*, Grote.

B. C., 1905, Pass D. Hope, 1 ♀. U. S. A., Washington Forest Reserve, Early Winter Creek, 2 ♀'s.

2512. *Plusia angulidens*, Smith.

U. S. A., Washington Forest Reserve, 1905, State Creek, 1 ♀.

Plusia orophila, n. sp.—Head and thorax blue-gray, mixed with some brown and black; palpi mostly black; tegulæ with diffused black medial line; tarsi black, ringed with white; abdomen gray, tinged with reddish-brown. Fore wing blue-gray, slightly irrorated with black, the terminal area tinged with reddish-brown; sub-basal line black, slightly defined by white on outer side, excurved below costa and ending at vein 1;

antemedial line obsolete on costal half, white, nearly straight and oblique from median nervure to inner margin; medial area black-brown from cell to inner margin; claviform absent; orbicular with faint whitish annulus, with gray centre, slightly defined by black above, round; reniform with whitish annulus, its inner edge straight and oblique, defined on each side by black, its outer concave at middle with some black in upper part and beyond middle; a U-shaped silvery-white mark filled in with gray below median nervure, its inner arm bent inwards; postmedial line double, filled in with whitish, slightly excurved below costa, oblique to vein 5, then slightly incurved; subterminal line absent; a terminal series of slight, black lunules, defined on inner side by gray lunules; cilia gray, mixed with brown and with series of blackish spots. Hind wing orange-yellow; some brown suffusion at base; a slight discoidal striga; the terminal area black-brown, narrowing to tornus; cilia chequered brown and white, and with brown line through them; the under side with the costal area slightly irrorated with brown, traces of a curved postmedial line.

Alberta, 1907, Brobokton Creek, 6 ♂, 2 ♀ type. U. S. A., Washington Forest Reserve, 1907, Early Winter Creek, 1 ♂. Expanse, 34–40 mm.

A specimen of this species was identified by Dr. Ottolengui as *P. diasema*, Boisd.; this, however, which is found in N. Europe and Asia, and in America, from Greenland to Labrador, has the head, thorax and fore wing much more strongly tinged with red-brown, the last with the antemedial line excurved below the cell, the stigma more V-shaped, with a slight tail or point beyond its lower extremity; the hind wing with the terminal area reddish-brown. The record from Colorado probably refers to the new species.

2528. *Plusia sacceni*, Grote.

Alberta, 1907, Mt. Athabasca, 1 ♂.

2532. *Plusia parilis*, Hübn.

Alberta, 1907, Mt. Athabasca, 6 ♂'s; Wilcox Pass, 1 ♂.

2535. *Plusia alticola*, Wlk.

Alberta, Mt. Assiniboine, 1 ♀; 1907, Wilcox Pass, 2 ♂'s; Brobokton Creek, 1 ♂; Brazeau Creek, 1 ♀. B. C., 1904, Kicking Horse Pass, Hector, 1 ♂.

The type was taken by Lord Derby in the Canadian Rockies in 1845, and is quite distinct from the European *devergens*, Hübn. The record from Colorado probably refers to this species.

NOCTUINÆ.

2782. *Syneda divergens*, Behr.

B. C., 1905, Ashnola, 1 ♂, 1 ♀.

2781. *Syneda graphica*, Hübn.

B. C., 1904, Up. Kerameos, 1 ♂; 1905, 1 ♂; Ashnola, 1 ♀.

2783. *Syneda patricola*, Wlk.

Alberta, 1904, Banff, 1 ♂; Laggan, 1 ♀. B. C., 1904, Greenwood, 1 ♀; Kaslo, 1 ♀; Up. Kerameos, 1 ♀.

2800. *Syneda athabasca*, Neum.

Alberta, 1907, Mt. Athabasca, 3 ♂'s; Wilcox Pass, 2 ♂'s, 1 ♀.

2799. *Syneda hudsonica*, Grote and Rob.

Alberta, 1904, Banff, 1 ♂; 1905, 1 ♀; 1907, Kootenay Plains, 1 ♂. B. C., 1904, Kaslo, 2 ♂'s; Greenwood, 1 ♂; Okanagan, 2 ♂'s, 1 ♀; 1905, Ashnola, 4 ♂'s.

2788. *Syneda ochracea*, Behr.

B. C., 1904, L. Okanagan, Penticton, 1 ♂; 1905, Up. Kerameos, 1 ♀.

A NEW LEPIDOPTEROUS GALL-PRODUCER.

BY A. COSENS, M.A., TORONTO.

Stagmatophora ceanothiella, n. sp.—This small moth produces galls on *Ceanothus Americanus*, L.; these abnormal growths are found commonly on a main stem, but rarely on a branch. The flower cluster is sometimes entirely aborted, but usually only partly so, the lower pedicels in the cluster remaining normal.

In the majority of cases the gall is terminal, but in a few instances the stem was found to project a short distance beyond it. The gall has the relatively simple structure of a spindle-shaped enlargement of the stem. In length it varies from 10 to 15 mm., and in greatest width from 5 to 8 mm. It is roughened on the outside by the stumps of the aborted branches. On account of the shortening of the stem axis and the consequent crowding of the nodes, these branches are more numerous on a gall than on a corresponding length of normal stem. This gives the gall a gnarled surface and forms a strongly-protected case for the larva. The gall in some cases is surmounted by a tuft of leaves growing from its apex.

The aperture through which the moth escapes from the gall is made always near the upper end.

The insect passes the winter in the larval condition. Galls examined in December were lined with silk, which, no doubt, was a protective measure against cold and moisture.

The dates of emergence of specimens from galls collected are the following: June 23, 1907, five specimens; June 24, ten; June 25, six; June 26, five; June 27, two, and June 30, three.

Larva.—Length, 6–8 mm. Head black, the rest of the body light yellow, except the dorsal part of the first segment. This bears a pair of light brown, somewhat triangular-shaped, spots. The base of the triangle is slightly indented. Four rows of very short hairs run the whole length of the body, two of these rows are dorsal and two lateral. The rows are composed of from 4 to 6 hairs on each segment.

Pupa.—Length, 4–5 mm. Light brown in colour.

Imago.—♀, ♂. Expands 10–12 mm. Head: Colour dark brown, with a bright bronzed lustre, which imparts a greenish tint. The basal joints of the antennæ are relatively long and much enlarged at the distal end.

Thorax: The dorsal surface presents the same lustrous bronzed appearance as the head, but the ventral surface is somewhat paler in colour and with a less brilliant lustre. The legs present the same colour as the dorsal aspect of the thorax, but the lustre is less brilliant on the inner surface.

The fore wings show the lustrous bronzed-green of the body with less brilliancy below. They are fringed along the inner and the outer margins. The fringe is light brown in colour, darkening towards the outer margins of the wings. It entirely lacks the lustre of the remainder of the wings.

The hind wings are plume-like, as all the margins of the wings carry the light brown fringe, which becomes darker on the outer margin. The axis of the wing is of a lighter brown colour than the fringe, and presents in some cases a silvery lustre.

Abdomen: Coloured like the thorax, but the tints are decidedly lighter and the lustre slightly silvery.

I am indebted to Mr. Augustus Busck, of the Smithsonian Institution, who has supplied me with the generic relations of the form. He states that it is somewhat aberrant in the genus *Stagmatophora*, as veins 5, 6 and 8 are all from one stalk in the fore wings.

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LIST OF HEMIPTERA TAKEN BY W. J. PALMER, ABOUT QUINZE LAKE, P. QUE., IN 1907.

BY E. P. VAN DUZEE, BUFFALO, N. Y.

Once more I am indebted to Mr. W. J. Palmer, of Buffalo, for a very interesting series of Hemiptera, taken by him in August, 1907, on a vacation trip from Lake Temagami, Ont., to Quinze Lake, P. Q., and along the Ottawa River and its lakes to Barrier Lake. This collection is much more extensive than that made by him in 1906, notes on which were published by me in the CANADIAN ENTOMOLOGIST for December, 1906. Among the 116 species taken in 1907, were several of unusual interest, such as *Corythuca incurva*, Uhler ; *Neoborus Palmeri*, Reuter ; *N. commissuralis*, Reuter ; *Ceresa Palmeri*, Van Duzee ; *Aphrophora Signoreti*, Fitch ; *Platymetopius obscurus*, Osborn ; *Thamnotettix flavovirens*, G. & B., and *Cicadula lineatifrons*, Stal.

Of the three new forms taken by Mr. Palmer on this trip, the descriptions of two Capsids : *Neoborus Palmeri* and *commissuralis* are by Dr. O. M. Reuter, of Abo, Finland, and will also appear (in Latin) in a paper about to be published, entitled, "Bemerkungen über nord amerikanischen Capsiden" in Ofversigt af Finska Vetens. K. Soc. Forhandl., 1908.

PENTATOMIDÆ.

Homæmus æneifrons, Say.—This boreal species was taken in abundance at all stations. I have found it common in the Adirondacks, but it is rarely taken in the level country about Buffalo.

Eurygaster alternatus, Say.—Nigger Point, Quinze Lake, Lake Temagami, and elsewhere. A common and widely-distributed form.

Euschistus tristigmus, Say.—Several specimens of the northern form, with obtuse humeri, were captured on Bear Island, Lake Temagami.

Cosmopepla carnifex, Fabr.—Taken along Barrier River, and at other points in the Ottawa River water-shed.

Clinocoris lateralis, Say.—Nigger Point, Quinze Lake and Barrier River, several examples. Formerly placed in genus *Acanthosoma*.

Podisus modestus, Dallas. Taken at Klauck's, and at Temiskamingue P. O., both in the Ottawa district.

COREIDÆ.

Protenor Belfragei, Hagl.—Taken at Temiskamingue P. O. It has been redescribed as *Tetrahinus Quebecensis* by Provancher.

Megalotomus 5-spinosus, Say.—Bear Island, Lake Temagami. Two examples.

Alydus eurinus, Say.—Taken with the preceding, and at Temiskamingue Post Office.

Alydus conspersus, Montd.—Taken with the foregoing. It may best be distinguished by the dotted membrane.

Corizus crassicornis, Linn.—Taken at all stations along the Ottawa River, and at Temagami. This is the species I have heretofore determined, I believe correctly, as *novæboracensis*, Sign. I am indebted to Dr. Horvath for its identification with the common European species.

LYGAEIDÆ.

Ortholomus longiceps, Stal. Taken at Bear Island, Lake Temagami. I now use this name for our northern form, which was included by Dr. Uhler in his description of *Nysius providus*, and which, it seems to me, includes both this species and *Jamaicensis*, Dallas. Genus *Ortholomus* may be distinguished from *Nysius* by the rectilinear costal margin of the elytra.

Nysius thymi, Wolf.—Nigger Point, Quinze Lake. On the occasion of his recent visit to Buffalo, Dr. Horvath set aside in my collection as *thymi* the *Nysius* taken by me at Lake Placid, N. Y., and listed as *angustatus* in my "List of the Hemiptera taken in the Adirondacks." The present specimen taken by Mr. Palmer is a little larger and paler, and may be the true *angustatus* if that species really be distinct from *thymi*, which I doubt.

Ischnorhynchus resedæ, Panz.—Temagami, one example.

Cymus claviculus, Hahn.—Lake Temiskamingue, two examples.

Ligyrocoris diffusus, Uhler.—Taken at all stations, and apparently as abundant as in Western New York. This is the species formerly listed as *sylvestris*, Linn. The latter, if a *Ligyrocoris* at all, is *contractus*, Say, and not *diffusus*.

Ligyrocoris contractus, Say.—Like the last, this species was taken at all stations where Mr. Palmer collected. It is rare about Buffalo, but becomes abundant further north.

TINGIDÆ.

Corythuca incurva, Uhler.—Temagami Lake, Temiskamingue, and Barrier River. I have carefully compared these specimens with an example determined by Dr. Uhler, and find them certainly identical. They seem to be sufficiently distinct from the smaller specimens of *juglandis* taken in Western New York and elsewhere.

REDUVIIDÆ.

Sinea diadema, Fabr.—One example taken at Klauck's. Mr. Palmer reports this as the only specimen seen by him.

Reduviolus ferus, Linn.—Temiskamingue and Nigger Point, Quinze Lake. This is an imported species that follows cultivation into every portion of North America. Here it seems to have followed up the Ottawa River almost in advance of civilization.

Reduviolus vicarius, Reut.—Taken in numbers along Quinze Lake. This is the species so determined in my list of Lake Placid Hemiptera, and list of the Hemiptera taken by Mr. Palmer at Lake Temagami. I sent specimens to Dr. Reuter, and he writes me that it is not the true *vicarius*, but a species very near *limbatus*, Dahlb. The latter species was, however, described as very close to *limbatus;* so, if the present species be not *vicarius*, it must be very near it. It seems to be boreal in distribution. I now follow the European entomologists in using the name *Reduviolus* for this genus in place of *Coriscus*, Schrank.

Reduviolus propinquus, Reut.—Quinze Lake, one example.

CAPSIDÆ.

Miris dolobratus, Linn.—Taken at Temiskamingue only. This species is now placed in genus *Miris*, of which it is the type. Formerly listed as a *Leptopterna*.

Stenodema trispinosa, Reut.—White Rapids, Barrier River and Temiskamingue. This is the North American form, formerly determined as *Brachytropis calcarator*, Fall. Dr. Reuter now considers our American form as a distinct species, and has so published it. *Brachytropis* is placed as a synonym of *Stenodema*, formerly called *Miris*.

Stenodema affinis, Reut.—Apparently common everywhere Mr. Palmer collected. Mr. Kirkaldy gives the name *instabilis*, Uhler, priority, quoting Dr. Uhler's reference to Proc. Bost. Soc. Nat. Hist., 1871, p. 104, but as a matter of fact the species was not included in that paper. Its first publication was in the Bul. U. S. Geol. & Geog. Surv., vol. II, No. 5, p. 316, 1876, and, consequently, was subsequent to Reuter's *affinis*, which appeared in 1875.

Trigonotylus ruficornis, Fall.—Two examples from Nigger Point, Quinze Lake.

Collaria Meilleuri, Prov.—Barrier River and Temiskamingue.

Resthenia insignis, Say.—At Barrier River Mr. Palmer took two examples of this species that were entirely black, except a touch of rufous on the collar and lateral submargins of the pronotum. I have taken it at Hamburg and Gowanda, N. Y., and have seen others from Idaho and Winnipeg. It seems to be northern in distribution.

Monolocoris filicis, Linn.—Temagami and Quinze Lake.

Neoborus amoenus, Uhl.; var. *Palmeri*, n. var., Reuter.—Pale livid, eyes castaneous, clypeus piceous toward its apex; vitta below the base of the antennæ ferruginous, two vittæ on either side of the pronotum nigro-piceous, the exterior submarginal, not attaining the base, interior extending from the exterior angle of the collum to the base of the pronotum; corium with a slender vitta along the apical one-half of the cubital vein and a line within the basal margin of the membrane nigro-piceous; apex of the second joint of the antennæ and the two ultimate joints black, third pale at base. Female.—Klauck's, one example. A very pretty and distinct species.

Neoborus (*Xenoborus*, n. subg.) *commissuralis*, n. sp., Reuter.—Oblong. Differs from *N. amoenus*, Uhl. *(saxeus, Uhl., not of Dist.)*, in having the rostrum somewhat shorter, the costal margin of the hemelytra less rounded, and especially in having the sides of the pronotum not at all calloused; pale yellowish-white, smooth and polished, antennæ, eyes, claval commissure slenderly, and the extreme apex of the rostrum and the tarsi black; head about two-fifths narrower than the base of the pronotum, viewed from before a little shorter than its basal width with the eyes; viewed from the side the cheeks in both sexes as high as the eyes; vertex slenderly margined; in the male about three-fourths, in the female two to two and a-half times broader than the eyes; rostrum attaining the apex of the mesosternum; antennæ slender, first joint in the male as long as the head viewed from before; in the female a little shorter, second joint in the female twice longer than the first and a little longer than the basal width of the pronotum; in the male distinctly longer; pronotum about one-fifth shorter than its basal width, sides nearly straight, callosities moderately elevated, concolorous, in the middle somewhat indistinct, disk on either side quite densely and strongly rugose-punctate; hemelytra long surpassing the abdomen, obsoletely punctate, membrane whitish-hyaline, veins pale, brachial vein towards its apex and a longitudinal vitta within the apex of the areole fuscous. Male and female. Length 7, width 2 mm. Klauck's four specimens taken with the preceding. This is the species found at Island Lake last year by Mr. Palmer, and listed by me as *Neoborus*, sp. I took it at Lake Placid, and have seen others from Montreal taken by Mr. Beaulieu.

Poecilocapsus lineatus, Fabr.—Apparently common at all places along the Ottawa River.

Camptobrochis grandis, Uhler.—Temagami, Temiskamingue and Nigger Point on Quinze Lake.

Lygus pratensis, Linn.—Abundant everywhere, with its variety *flavonotatus*, Prov.

Lygus invitus, Say.— Klauck's, on Quinze Lake.

Lygus monachus, Uhler.—One example from Barrier River.

Lygus pabulinus, Linn.—White Rapids, one example.

Adelphocoris rapidus, Say.—Apparently abundant at all stations. Dr. Reuter has separated this species and its allies from *Calocoris*.

Neurocolpus nubilus, Say.—Temagami, one example.

Compsocerocoris annulicornis, Reut.—Barrier River.

Phytocoris pallidicornis, Reut.—Taken in numbers at all stations.

Phytocoris eximus, Reut.—Bear Island, Lake Temagami.

Lopidea marginata, Uhler.—This species seems to have been common, as Mr. Palmer brought home numbers from Temagami, Barrier River and White Rapids.

Stiphrosoma stygica, Say.—Temagami, Barrier River and Temiskamingue. These agree with material from the mountains of Colorado in being a little smaller than those taken about Buffalo.

Dicyphus agilis, Uhler.—Temiskamingue and Nigger Point, Quinze Lake.

Hyaliodes vitripennis, Say.—Mr. Palmer brought home from Barrier River one example of the dark form that, about Buffalo, is found on oak.

Cyrtorrhinus marginatus, Uhler.—Taken at Barrier River.

Orthotylus, sp.—Quinze Lake, one example.

Oncotylus chlorionis, Say.—Temiskamingue, one example.

Plagiognathus obscurus, Uhler.—Abundant at all stations.

Plagiognathus sp.—One example of a small species, with a vittate scutellum, was taken at Temiskamingue.

GERRIDÆ.

Gerris remigis, Say.—One brachypterous example was taken at Quinze Lake.

HOMOPTERA.

FULGORIDÆ.

Cixius stigmatus, Say.—Taken in numbers at Nigger Point, Quinze Lake, Temiskamingue, and about Lake Temagami.

Liburnia pellucida, Fabr.—One macropterous male taken at Quinze Lake.

Liburnia sp.—Three brachypterous females from Quinze Lake.

MEMBRACIDÆ.

Ceresa basalis, Walker.—This species was taken in large numbers, and shows a wide range in colour variation. The pale females are almost entirely green or fulvous when dry, while the darker males are deep piceous black marked, with pale only on the anterior margins of the head, base of the elytra, tibiæ and tarsi. The pale colour first shows on the summit of the metapodium, and the last black colouring to disappear is the line below the suprahumeral horns and the banding on the femora. *Ceresa turbida*, Goding, is certainly a synonym of this, his material being of the paler form found in the Northern States. I have received this same species from the Saskatchewan, and from the Selkirk Mountains in British Columbia.

Ceresa Palmeri, n. sp.—Closely allied to *borealis* and *constans*. Smaller, more slender, and less strongly coloured than *constans*. Clypeus broad, with the tylus strongly produced. Front of the pronotum rather low, vertical, convex before, with a prominent median carina; sides rectilinear, abruptly curved outward above to the horizontal acute subterete and black-tipped horns. These suprahumeral horns are strongly recurved, their posterior and inferior surfaces are concave and marked with a brown line above and below, on either side of the latter of which is a pale carina; triangular superior surface between the horns concave, a little convex along the median carina; posteriorly the pronotum is but feebly elevated, the apex is very slender, exceeds the abdomen, and is tipped with black. Colour pale fulvous, fading to pale greenish-yellow on the head and beneath; the horns and posterior carina ferruginous brown shading to piceous posteriorly; sides mottled with pale; elytra long, subhyaline, a little smoky along the apical margin. Tip of the rostrum, tarsal claws and tibial spines black.

Last ventral segment of the female rather long, angularly cleft nearly one-half of its length; the sides of this sinus convexly arcuated as far as the rounded outer angles. Plates of the male long and rather slender, scarcely shorter than the pygofers. Ultimate ventral segment very short. Length to the tip of the elytra 7 mm.

Described from five males and one female ; five of these were taken about Lake Temagami, the other was taken by Mr. Palmer on Fox Island, Red Cedar Lake, in 1906, and was listed by me as a small male of *brevicornis*. This additional material enables me to correct that determination. Mr. Palmer has spent several of his summer outings collecting Hemiptera in his characteristically energetic way, and has brought home some very interesting material, and it affords me pleasure to recognize the scientific value of his work by naming this species after him.

Telamona coryli, Fitch.—One female taken at Nigger Point, Quinze Lake, is of the dark type described by Dr. Fitch as *Telamona tristis*.

Enchenopa binotata, Say.—Quinze Lake, one example.

Campylenchia curvata, Fabr.—Taken in numbers at all places where Mr. Palmer collected.

CERCOPIDÆ.

Lepyronia 4-angularis, Say.—Apparently abundant. The males are very clearly marked.

Aphrophora 4-notata, Say.—Another common form.

Aphrophora parallela, Say.—Several specimens taken by Mr. Palmer average a little smaller than those taken about Buffalo.

Aphrophora Signoreti, Fitch.—One example taken near Quinze Lake. In form of vertex and front, this species is intermediate between *parallela* and *saratogensis*. It can finally be determined by the form of the plates of the male, which are well characterized by Dr. Ball in his paper on this family. This has proved to be a rare species, so far as my experience goes. I have one female taken by Prof. Houghton, in the Adirondacks, and a male taken by Dr. Brodie, at Toronto, Ont. The present specimen is, I think, the fourth I have seen.

Philaronia bilineata, Say.—Taken at Temiskamingue and Quinze Lake.

Clastoptera obtusa, Say.—Common everywhere Mr. Palmer worked.

Clastoptera proteus, Fitch., var. *nigra*, Ball.—Taken at nearly all stations, and apparently common. In the female there is a fulvous spot on the costa which is wanting in the male.

BYTHOSCOPIDÆ.

Bythoscopus sobrius, Walker.—A rare species, of which Mr. Palmer took one example at Temiskamingue P. O.

Bythoscopus cognatus, VanD.—Taken at Lake Temagami and along Quinze Lake and Barrier River.

Pediopsis viridis, Fitch.—White Rapids and Barrier River. No males were taken.

Pediopsis basalis, VanD.—One female taken at Temiskamingue P. O. This belongs to the dark form, with banded elytra, of which I have taken examples at Lancaster and Hamburg, N. Y. This individual differs, however, in having a black propleural point not found in the specimens from Western New York. These banded forms seem to connect *basalis* with *bifasciata*, and they may prove to be a distinct species.

Pediopsis bifasciata, VanD.—One very pale specimen that I place here with some doubt, was taken at Klauck's, on Quinze Lake.

Idiocerus pallidus, Fitch.—Taken throughout the Ottawa River district.

Idiocerus suturalis, Fitch.—Taken commonly. The males were deeply coloured, and were more abundant than the females. The variety *lunaris*, Ball, was not taken on this trip.

Idiocerus alternatus, Fitch.—A good series from Nigger Point, Quinze Lake. I have placed under this name the common species found throughout the northern United States and Canada, and west to California. It may be distinguished from our other alternate-veined species by its having the apex of the head brown and polished, with the two round dots on the vertex distinct, and not confounded with the transverse black band. The commissural margin has a white spot in most specimens.

Idiocerus sp.—This species, of which Mr. Palmer took one example at Temagami, has a broad, irregular, black band across the apex of the head, in which the round dots are scarcely distinguished. This band is bisected by a pale median line, and below it are a pair of transverse spots on the base of the front. The elytral nervures are scarcely alternated. This species I have also taken at Ridgeway, Ont., near Buffalo.

Idiocerus lachrymalis, Fitch.—Barrier River, two examples. This is our largest *Idiocerus*. It has the same black band on the vertex that we find in the preceding species, but it is not bisected by a pale median line.

Agallia novella, Say.—Specimens of this species were brought from all stations along Quinze Lake and Barrier River. These are all of the pale form, in some of which the black pronotal spots are entirely wanting.

Agallia sanguinolenta, Prov.—Temiskamingue, P. O. One example.

(To be continued.)

NOTES ON CORIXIDÆ NO. 1 [HEM.].

BY G. W. KIRKALDY, HONOLULU, H. ISLANDS.

Species of the Corixidæ cannot be mistaken for those of any other family of Hemiptera. The remarkable structure of the mouth-parts (which caused Borner to elevate the family into a separate suborder, Sandaliœrhyncha), and, in the males, the possession of two sets (apparently) of stridulating organs, abundantly separate them from any other family. Although not so specially adapted, to our eyes, for such a life, the Corixidæ have gained a more complete mastery over the problems of aquatic existence than their relatives, the Notonectidæ and Naucoridæ, if we may judge by the much greater number of their species.

The structure of the Corixidæ is extremely interesting, and there are probably no other insects whose males can boast of at least four separate secondary sexual characters (of these, two are of great specific importance). Their stridulation and general biology have recently been briefly summarized by myself.*

The genera of Corixidæ may be tabulated as follows :

1. Scutellum covered by pronotum only at the anterior margin ....(2).
1a. Scutellum covered (except sometimes at posterior angle) by pronotum ....(4).
2. Metapleura simple. Minute species, never over 5 mill. long....(3).
2a. Metapleura deeply impressed behind, forming so-called "parapleura"; species over 6 mill. long............3, *Diaprepocoris*, Kirkaldy.
3. Pronotum truncate, or (generally) convex behind............................1, *Micronecta*, Kirkaldy.
3a. Pronotum roundly emarginate behind ......2, *Tenagobia*, Bergroth.
4. Males ....(5).
4a. Females ....(10).
5. Strigil absent.................................(6).
5a. Strigil present ....(7).
6. No stridular area; hind tarsi not marked with black..4, *Cymatia*, Flor.
6a. Stridular area present ; hind tarsi usually marked conspicuously with black (the segment itself, not the fringe of hairs only) ....5, *Callicorixa*, White.

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*"The stridulating organs of Water-bugs, especially of Corixidæ," 1901, J. Quekett Micr. Club (2), viii, 33-46, Pls. 3-4 (often cited as "Quebec !"), and "A Guide to the Study of British Water-bugs," 1905, ENTOMOLOGIST, XXXVIII, 231-6, etc.

7. Paler stridulator composed of pegs ranging from bristles to short "peg-tops," the transition gradual.....6, *Glænocorisa*, Thomson.

7a. Paler stridulator never with bristles, although the "pegs" may be elongate (not to be confused with the lower fringe of bristles..(8).

8. Asymmetry on right side..................................(9).

8a. Asymmetry on left side. Pronotum and tegmina smooth, shining ....9, *Corixa*, Geoffroy.

9. Tegmina with short, black hairs (immaculate, nonlineate) ....8, *Agraptocorixa*, Kirkaldy.

9a. Tegmina without short black hairs ....7, *Arctocorisa*, Wall.

A. Pronotum transversely lineate, generally rostrate ; tegmina more or less rostrate ....(B).

AA. Pronotum immaculate, smooth ; tegmina smooth, polished ....subg. 3, *Hesperocorixa*, nov.

B. Tegminal hairs normal, tibiæ (♂) rarely produced triangularly.............subg. 1, *Arctocorisa*, s. str.

BB. Tegminal hairs of two sorts, tibiæ (♂) triangularly produced (type *pygmæa*, Fieber)....subg. 2, *Trichocorixa*, nov.

10. Face flattened ....(11).

10a. Face convex ....(14).

11. Pronotum immaculate ; face smooth ....4, *Cymatia*.

11a. Pronotum with impressed transverse lines ; face hairy.................................6, *Glænocorisa*.

12. Pronotum immaculate ....(13).

12a. Pronotum lineate ....(14).

13. Tegmina with short black hairs................8, *Agraptocorixa*.

13a. Tegmina not with short black hairs ....(subg.) *Hesperocorixa*.

14. Pronotum and tegmina smooth, shining ....9, *Corixa*.

14a. Pronotum and tegmina more or less rostrate...............(15).

15. A conspicuous black spot usually on hind tarsi......5, *Callicorixa*.

15a. Hind tarsi pale, fringing hairs dark in some species..7, *Arctocorisa*.

A. Tegminal hairs normal ....*Arctocorisa*, s. str.

AA. Tegminal hairs of two sorts ....(subg.) *Trichocorixa*.

I do not know the Brazilian *Heterocorixa*, White, of which the types are apparently lost.

ARCTOCORISA, Wallengren.

This genus was originally founded for certain species with a percurrent pronotal keel (*Carinata*, etc.), which, however, are scarcely even subgenerically separable from *Linnei*, *fossarum*, etc., so that it has been necessary to extend the limits of *Arctocorisa* to include *Basileocorixa*, Kirk. The type of *Corixa*, Geoffroy, is *striata*, Geoffr., (= *Geoffroyi*, Leach); the genus has not yet been found in America, whereas *Arctocorisa* has already been numerously reported.

1. *A. hydatotrephes*, n. sp.—Differs from any of the species of *Arctocorisa* known to me, by the complete anastomosis of the dark lines on the clavus, corium and membrane, the margins of these areas being more or less broadly pale.

Head and legs yellowish-testaceous, head dorsally more or less soiled. Pronotum testaceous, with five grayish-brown lines. Tegmina blackish-brown, embolium and all the margins pale, the lateral margin being broken by the dark colour only at the extralateral margin of membrane. Sterna very pale castaneous. Meso- and metanotum and abdomen blackish, or at least dark fuscous, margins of the latter pale. Fringe of hind tibiæ fuscous. Head between eyes very narrow, less than a third of the width of the pronotum. Pronotum transverse, short, feebly rostrate, a tubercle at the apical margin in the middle. Middle tibiæ one-third longer than the tarsi, and one-seventh longer than the subequal claws. Tegmina obsolescently rostrate.

♂.—Face flat medianly, scarcely excavated. Strigil suboval, transversely placed, with five rows. Pala subcultrate, dorsally arched, with 18 or more pegs, which lengthen as they approach the apex, and keep parallel and close to the dorsal margin soon after they leave the base.

♀.—Pala elongate cultrate.

Length, 6 mill. Hab.: Raleigh, North Carolina (Brimley).

2. *A. macroceps*, n. sp.—Yellowish-testaceous. Eyes grayish-brown. Pronotum brown, with three comparatively broad brown-testaceous lines, second and third partly confused. Tegmina brown; clavus with basal lines broad and subentire, the others much broken up; corial lines much abbreviated and contortuplicated, obscurely triseriate. Fringe on hind tibiæ fuscous. Head large, rounded in front, one-third longer than wide between the eyes. Pronotum 2½ times as wide as the head between the eyes, and more than 4 times as wide as its own middle length. Pronotum and clavus rostrate, corium more feebly. Middle tibiæ nearly one-half longer than the tarsi, which are subequal to the subequal claws.

♀.—Pala cultrate, arched near the base.

Length, 3⅓ mill. Hab.: Raleigh, N. C. (Brimley).

Subgenus HESPEROCORIXA, nov. subgen.

This has the characters of *Arctocorixa*, Wallengr. *(sens. lat.)*, but differs by the non-rostrate pronotum and tegmina and the non-lineate pronotum. From *Agraptocorixa*, Kirk., it differs by the total absence of black hairs, the surface being polished. From *Corixa*, Geoffr., it differs by the ♂ asymmetry being on the other side, and by the absence of lineations. It may prove a good genus.

3. *H. Brimleyi*, sp. nov.—Head, fore legs, middle femora and claws, hind coxæ, etc., pale yellow. Eyes gray-brown. Pronotum and tegmina pale ferruginous, sometimes suffused with sanguineous, base of clavus and a large spot near apex of corium blackish-brown. Sterna, meso- and metanotum and abdomen black or blackish, pleurites and apical segment of abdomen yellowish, partly suffused with red. Middle tibiæ and hind femora and tibiæ sanguineous, the fringe on the latter golden-brown.

Pronotum short, very transverse, polished, very faintly rostrate, if at all, obsolescently keeled percurrently. Tegmina smooth and polished, obsolescently punctured, non-lineate, membrane angularly rounded at the apex. Middle tibiæ one-eighth longer than the tarsi, which are equal to the mutually equally long claws.

♂.—Face slightly flattened in the middle, scarcely excavated. Pala cultrate, with a closely-set row of about 28 pegs. Strigil rather large, oblong, oval, with five subeven rows.

♀.—Pala elongate cultrate.

Length, 9 mill. Hab.: Raleigh, N. C. (Brimley).

This is very distinct from any other American species known to me.

EARLY STAGES OF NORTH AMERICAN MOTHS.

BY HENRY ENGEL, PITTSBURG, PA.

Eutolype bombyciformis, Smith.

Ova.—Rose-pink, round, base flat, top depressed, 36 vertical ridges terminating in a raised circle at the crest. Ridges serrate, tipped whitish. Micropyle slightly raised and white.

Diameter, 0.80 mm. Height, 0.50 mm.

Eggs deposited April 30–May 2nd. Larvæ hatched May 13-14th.

First Stage.—Length, 2.50 mm. Head bilobed, a little wider than body, glossy black, covered with short hair. Mouth-parts black. Thoracic shield brown, trapezoid in outline. Body pale green, shaded with brown dorsally on thoracic segments. Thoracic legs pale green, claws black. Abdominal legs green, with two brown patches outwardly, the smaller one just above claws. Tubercles small, black, with short black setæ.

First moult May 18th.

Second Stage.—Length at rest, 4 mm; extended, 5 mm. Head and mouth-parts yellowish-green. Ocelli glossy black. Body light green, a faint whitish subdorsal line. Legs concolorous, claws black. Tubercles not contrasting. Setæ gray.

Second moult May 18th.

Third Stage.—Length, 7 mm. Head yellowish-green. Ocelli black. Body and legs light green. A gray dorsal line interrupted in the intersections. Subdorsal line more conspicuous than in stage 2, broken into spots on each segment. Tubercles light gray. Setæ on i and ii blackish, the lower ones gray.

Third moult May 31st.

Fourth Stage.—Length, 13 mm. Head pale green, 2 mm. wide. Ocelli black. Body green dorsally, lighter green below subdorsal line. Dorsal, subdorsal and stigmatal line yellowish-green. Legs pale green. Tubercles oval, prominent, pale yellow, with brown centre. Setæ dark gray.

Fourth moult June 8th.

Fifth Stage.—Length, 23 mm. Head 3 mm. wide, bluish-green. Mouth-parts brown. Ocelli black. Body yellowish green above, bluish-green below stigmatal line. Legs pale green, claws a shade lighter. Dorsal and subdorsal lines pale yellow, the former interrupted in the intersections and on the somites. The subdorsal line narrow and broken into irregular spots, the stigmatal line prominent, brighter yellow and continuous from second to anal segment. Tubercles prominent, pale yellow, with brown centre, iv of equal distance from and in line with spiracle except on segment 6, where it is slightly above, and in 7, where it is further removed and lower.

Larvæ matured June 17th. Length, 38–40 mm.

Pupa.—Light brown, darker over the eyes and on anal segment. Wing-cases ornamented with dentate striations. The segmental rings have numerous small round dents anteriorly, smooth posteriorly. Cremaster armed with four short spines. Two crescent-shaped dark brown raised ridges in subdorsal area on anal segment.

Pupation occurs in cells from 3–4 inches below surface.

Food plant.—*Carya alba*, Nutt., Shellbark Hickory.

I was fortunate in finding 12 females of this species during two afternoons in a beautiful hard timber woods near New Brighton, Pa., last April. They emerge about noon, and may be found on the trunk of the

Hickories. One specimen was taken at rest on an Oak. It showed signs of flight, and fertile ova were obtained. The moths have been taken from April 18–May 3rd.

Nacophora quernaria, Smith and Abbott.

Eggs deposited June 1st.

Ova. — Yellowish-green, with metallic reflections. Acorn-shape inverted, base ovally rounded, top broad, slightly convex. A circle of white, irregular, raised spots at the periphery, ranging from 18–21 in number.

Diameter, 0.55 mm. Height, 0.80 mm.

Larvæ hatched June 16–17th.

First Stage.—Length, 2.60 mm. Head 0.45 mm. wide, rounded, slightly bilobed, dull brown, shading darker to the mouth-parts. Fine irregular reticulations and a few gray hairs. Ocelli dark brown. Body velvety dark brown. Thoracic shield gray. Tubercles along dorsum small, blackish, with short gray setæ. An apparently white line along the side consisting of the prominent cream-coloured tubercles and intermediate speckles of white. Tubercles i, ii, iii on segment 2, and i, ii on segment 11 are in line laterally. Ventrally the tubercles are small, with short gray setæ. Legs gray, mottled with brown.

First moult June 21st.

Second Stage.—Length, 6 mm. Head 0.80 mm. wide, angular, notched in centre of the crown, depressed in front, dark brown, with numerous irregular light brown speckles. Occelli glossy black. Body brown. On segment 5 two eminences or lumps have developed bearing tubercle ii. Tubercles along dorsum blackish, larger on segments 2, 5 and 11, on sides gray, centered with brown. The sides have whitish striations. Legs as in stage 1.

Second moult June 25th.

Third Stage.—Length, 10 mm. Head 1.40 mm. wide, thicker than body, square, deeply notched in centre, depressed in front, brown, with lighter mottlings. Body dark brown, with grayish mottlings, reddish on segment 5 and ash-gray on anal segment. Humps on segment 5 more developed. Body is sparsely covered with short gray hairs. Tubercles and legs as in stage 2.

Third moult July 1st.

Fourth Stage.—Length, 16 mm. Head 2 mm., shape as in stage 3. Brown, with a distinct dark brown dash from each angle converged to clypeus. Thoracic segments swollen and light brown. Body mottled brown and gray, with short gray hair. Anal segment and legs pale ash-gray. Tubercles as before except segment 6, which is swollen ventrally, with tubercles more prominent.

Fourth moult July 7th.

Fifth Stage.—Length, 22 mm. Head 2.60 mm. wide, the deeply-notched crown more pronounced. Body mottled brown and gray, with triangular light gray patches dorsally on segments 6–10. A faint gray line above spiracles. Tubercles reddish-brown and prominent on segments 2, 3, 5 and 10–11. On 4, 6, 9 and anal segment they are small, scarcely darker than ground. On under side of segment 6 reddish-brown.

Fifth moult July 14th.

Sixth Stage.—Length, 33 mm. Head 4 mm. wide, very angular, deeply notched, rather deep and rounded posteriorly, variable grayish to dark brown, with numerous fine blackish warts. Ocelli and mandibles dark brown. Thoracic legs light brown. Body variable gray to dark brown. Thoracic shield lighter. Entire body covered with light gray warts, giving a crenulate appearance. A blackish triangular patch on under side of segments 2 and 3. Tubercles on segment 6 beneath and on 2, 5 and 11 above large and prominent, reddish on 5 and 6, gray to light brown on the other segments. Humps on 5 prominent. A broad broken yellowish shade on under side of segments 4–8. Lilac on 9–12. Anal plate and legs ash-gray, rough. Spiracles black-ringed. At rest the thoracic segments are drawn in, and segment 2, with its prominent row of tubercles, forms a striking hump.

Larvæ matured July 25th. Length, 45–48 mm.

Pupa.—Head, thorax and wing-cases blackish-brown, segments a shade lighter, brown on the somites and blackish-satin in the intersections. The surface is very rough. Six raised humps appear on the head, four situated between base of the antennæ and two slightly above. Anal segment is smooth, glossy black above. Cremaster with a strong spine dividing into two outwardly curved hooks. Three smaller curved spines on each side.

The larvæ formed a silk cocoon within and under moss in the breeding cage.

Food-plant.—*Quercus*. Oak.

One male emerged on September 2nd. Normal dark form, with nearly straight extradiscal lines in secondaries. The balance of the pupæ are laying over until spring.

N. quernaria has interested me greatly, and I have tried different times to secure ova. In almost every instance when a female was obtained, we had unfavourable weather, and although I carried the female to extensive forests, I failed to secure fertile eggs. My efforts at New Brighton, Pa., again proved futile with a female secured about middle of May. On May 31st a belated female was found and secured to a branch of a bush leaning against an Oak. The following morning several clusters of eggs were found deposited on the bark of the tree, and these fortunately proved fertile.

I have invariably found newly-emerged specimens on or near Oak, and this led me to offer it as the food. Wild Cherry also was provided as an experiment, and the larvæ fed on it, but seemed to prefer Oak, which was used exclusively thereafter.

In my opinion there is considerable uncertainty about the specific standing of *Macophora cupidaria*, Grote. Several specimens, all males, have been determined for local collectors as *cupidaria*. These are all males of *quernaria*, which is an extremely variable species in coloration as well as structure of the extradiscal line in secondaries. The late Dr. Packard had one female of *quernaria*, and besides the copy of Grote's figure a poor male, which he presumed to be *cupidaria*, when treating these species in his Monograph. On page 412 he speaks of *cupidaria* possibly being the male of *quernaria*, which I think is correct. The figure of *cupidaria* in the Monograph Plate XI, fig. 5, is poor, as the left and right sides do not correspond at all. I have seen about 40 specimens in the local collections, and will briefly state the differences of the sexes of *quernaria :* Male : Coloration mostly dark ; in rare exceptions specimens occur where the costal area, collar and front of thorax are white, corresponding in this respect to the figure of *cupidaria*, cited above. The extradiscal line in secondaries is usually straight, in some specimens more or less angulated in the median area. Female : very variable, coloration usually light, corresponding with the figure of *quernaria*, Plate XI, fig. 6, in Packard's Monograph. Some specimens were noted which have the thorax brown and scarcely any white maculation on the wings. The line in secondaries is strongly angulated in the majority, in some specimens intermediate between these and the normally straight line of the male. The transverse lines of the primaries do not vary much. In the dark specimens of both sexes these lines are marked at the costa by irregular patches.

NEW SPECIES OF DOLERINÆ.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

The writer has in preparation some synoptic tables of the eastern species of Saw-flies. In this synoptic paper, it is not desirable to present the descriptions of new species. This paper and some others to follow later will include the descriptions of such new species as are to be included there.

Dolerus parasericeus, n. sp.— ♀. Surface of the scutellar appendage entirely smooth; pectus with three longitudinal rows of large punctures; antennal furrows with their outer edges continued by an elevated area to the eye; head rounded off between the vertex and the occiput; the post-ocular area with fewer, smaller punctures than the sides of the vertex; the scutellum and the inflexed portion of the lateral lobes of the mesonotum with the punctuation similar in size and approximately similar in number to the dorsal surface of the lateral lobes; body dull black; wings infuscated, especially around the margins. Length, 10 mm.

Habitat: Ithaca, N. Y.

Dolerus neosericeus, n. sp.— ♀. This species differs from the preceding in having the scutellum and inflexed portion of the mesonotum with the punctuation larger and distinctly more numerous than on the dorsal surface of the mesonotum; antennal furrows behind the ocelli distinct and sharply cut; upper orbits with an impunctate area; median lobe of the mesonotum distinctly, more densely punctured than the lateral lobes; body dull black; wings fuliginous. Length, 12 mm.

Habitat: Ithaca, N. Y., and Mt. Katahdin, Maine (J. O. Martin).

Dolerus polysericeus, n. sp.— ♀. Pectus with three longitudinal rows of large punctures; antennal furrows not traceable below the lateral ocelli; scutellum with fewer punctures than the lateral lobes of the mesonotum, and its punctures twice their size; postocular area more finely punctured than the posterior orbits; head with a carina between the occiput and the posterior orbits; body dull black; wings infuscated. Length, 11 mm.

Habitat: Ithaca, N. Y.

Dolerus colosericeus, n. sp.— ♀. Surface of the scutellar appendage smooth; pectus with three longitudinal rows of large punctures; antennal furrows not traceable below the lateral ocelli; scutellum and lateral lobes of the mesonotum uniformly punctured as to size and number; vertex with a fine impunctate ridge extending from the hind end of the antennal furrow to the hind margin of the eyes; an impunctate spot on the edge of the head between the vertex and the occiput; body uniformly black; wings fuliginous. Length, 14 mm.

Habitat: St. Anthony Park, Minn. (R. H. Pettit).

Dolerus monosericeus, n. sp.— ♂ ♀. Surface of the scutellar appendage smooth; pectus with three rows of large punctures; antennal furrows obsolete below the lateral ocelli; scutellum and lateral lobes uniformly punctured; vertex uniformly convex between the antennal furrows and the eyes; the vertex uniformly punctured; median lobe of the mesonotum uniformly, finely, densely punctured; body black; wings fuliginous. Length, 10 mm.

Habitat: West Springfield, Mass. (J. O. Martin).

Dolerus apriloides, n. sp.— ♀. Surface of the scutellar appendage smooth; pectus with the punctures all uniform in size; antennal furrows broad and distinct to near the middle of the eyes; the postocular area with many fine punctures; the posterior orbits with adjacent, large punctures, surface subrugose; impunctate area on the lateral surface of the lateral lobes of the mesonotum not extending to the median lobes; body black, with abdominal segments one to five rufous; wings infuscated on apical half. Length, 12 mm.

Habitat: Ithaca, N. Y.

Dolerus neoaprilis, n. sp.— ♀. Surface of the scutellar appendage smooth; median lobe of the mesonotum with larger, coarser punctures at sides than at middle; pectus uniformly punctured; antennal furrows indefinite, not continued below the lateral ocelli; impunctate area on the sides of the lateral lobes extending to the margin of the median lobe of the mesonotum; the postocular area and the posterior orbits finely punctured, the postocular area the more densely; body black, with abdominal segments one to five rufous; wings hyaline, smoky toward the apex. Length, 11 mm.

Habitat: Nebraska (F. Rauterberger).

Dolerus minusculus, n. sp.— ♀. Surface of the scutellar appendage smooth; mesonotum not with a band of larger punctures on each side of the median lobe; head with a distinct carina along the posterior margin between the occiput and the vertex; mesonotum with the median lobe densely punctured, the lateral lobes almost smooth ; body black, with the collar, tegulæ, the legs beyond the middle of the coxæ, and abdominal segments one to five, rufous ; the wings slightly infuscated. Length, 8 mm.

Habitat : Ithaca, N. Y.

Dolerus luctatus, n. sp.— ♀. Surface of the scutellar appendage smooth; mesonotum not with a band of large punctures on each side of the median lobe ; head with a distinct carina along the posterior margin between the occiput and the vertex ; mesonotum with the median lobe not more densely punctured than the lateral lobes ; body black, with the pronotum in front irregularly, abdominal segments one to four, abdominal segment five at base, apical half of the front coxæ, the front femora and tibiæ, the middle and hind femora, except a black spot above at apex, and the knees in part, rufous ; tegulæ white ; wings hyaline. Length, 8 mm.

Habitat : Ithaca, N. Y.

Dolerus neocollaris, n. sp.— ♂ ♀. Surface of the scutellar appendage smooth; mesonotum with the median lobe uniformly punctured; head not with a carina along the posteriar margin above ; antennal fovea linear, definite, three times as long as broad ; a transverse furrow extending across the head between the eyes and behind the ocelli ; head uniformly punctured ; body black, with the pronotum entirely, the median lobe of the mesonotum, and the upper half of the mesepimera, rufous ; wings slightly infuscated. Length, 10 mm.

Habitat : Fulton, N. Y. (C. R. Crosby) ; Ithaca, N. Y.

Dolerus icterus, n. sp.— ♀. Surface of the scutellar appendage smooth ; mesonotum with the median lobe uniformly punctured ; head not with a carina along the posterior margin above ; antennal fovea punctiform, shallow, hardly if at all longer than broad ; the transverse furrow between the eyes and behind the ocelli wanting; body rufous, with the head, the antennæ, the lateral lobes of the mesonotum, the scutellum at middle, the pectus, the saw-guides, the stigma on its outer half, and the legs, except the knees of the front pair, black ; wings infuscated at middle. Length, 9 mm.

Habitat : Saranac Inn, N. Y. (J. G. Needham).

Dolerus refugus, n. sp.— ♀. Surface of the scutellar appendage uniformly, finely punctured ; scutellum twice as densely punctured as the surface of the median lobe of the mesonotum; the postocular area and the posterior orbits uniformly, closely punctured; body black, with the pronotum, the median lobe of the mesonotum, and the upper half of the mesopleura, rufous; wings subhyaline, clouded at apex. Length, 12 mm.

Habitat: Ithaca, N. Y. (J. H. Comstock); Lake Forest, Ill. (J. G. Needham).

Dolerus inspectus, n. sp.—♂. Surface of the scutellar appendage longitudinally striate at middle and punctured at sides; scutellum and lateral lobes of the mesonotum uniformly punctured; the postocular area more finely and densely punctured than the posterior orbits; the median lobe of the mesonotum and the scutellum finely, densely punctured, the lateral lobes smooth, with distinct punctures; body black, with the abdominal segments one to five rufous; wings yellowish, veins black. Length, 9 mm.

Habitat: Ithaca, N. Y., and Chicopee, Mass. (J. O. Martin).

Dolerus cohæsus, n. sp.—♀. Surface of the scutellar appendage smooth at apex and striate at base; median lobe of the mesonotum uniformly punctured; antennal furrow extending from the occiput to the clypeus; vertex and postocular area differently punctured; lateral lobes of the mesonotum not so densely punctured as the median lobe or the scutellum; body black, with abdominal segments one to four, and the tibiæ, at least on their basal half, rufous. Length, 7 mm.

Habitat: Otto, N. Y. (J. H. Comstock), and West Springfield, Mass. (J. O. Martin).

Dolerus conjugatus, n. sp.—♀. Surface of the scutellar appendage longitudinally striate; head viewed from above with a deep transverse furrow, rounded at bottom, extending from the lateral ocelli to beyond the hind angles of the eyes; head with the postocular area more densely punctured than the sides of the vertex; body black, with the knees and the abdominal segments one to five, rufous; the wings hyaline, the veins black, the stigma paler below. Length, 8 mm.

Habitat: Otto, N. Y. (J. H. Comstock); Wellesley, Mass. (A. P. Morse); Fulton, N. Y. (C. R. Crosby).

Dolerus dysporus, n. sp.—♀. Surface of the scutellar appendage longitudinally striate; head viewed from above with a deep transverse furrow, rounded at bottom, extending from the lateral ocelli to beyond the hind angles of the eyes ; head with the postocular area and the sides of the vertex uniformly, finely punctured ; body black, with the abdominal segments one to five and the basal half of the sixth, rufous ; the wings hyaline, the veins and stigma black. Length, 10 mm.

Habitat : Ithaca, N. Y., and Chicopee, Mass. (J. O. Martin).

Dolerus plesius, n. sp.—♀. Surface of the scutellar appendage longitudinally striate ; head viewed from above with a deep transverse furrow, rounded at bottom, extending from the lateral ocelli to beyond the hind angles of the eyes ; head with a fine ridge extending from the edge of the eye obliquely toward the occiput ; mesonotum with the impunctate area on the sides of the lateral lobes not extending to the margin of the median lobe ; the median lobe of the mesonotum more densely punctured than the lateral lobes ; body black, with the prothorax, tegulæ, and abdominal segments four to five, rufous ; wings very slightly infuscated, veins and stigma black. Length, 8 mm.

Habitat : Lake Forest, Ill. (J. G. Needham).

Dolerus agcistus, n. sp.—♀. Surface of the scutellar appendage longitudinally striate ; head viewed from above with a deep transverse furrow, rounded at bottom, extending from the lateral ocelli to beyond the hind angles of the eyes ; head without a fine ridge extending from the eye toward the occiput ; mesonotum with the impunctate area on the sides of the lateral lobes extending broadly to the margin of the median lobe; mesonotum finely, densely punctured; body black, with the prothorax, tegulæ, median lobe of the mesonotum, upper half of the mesopleuræ, the metapleuræ, and the abdomen, except the saw-guides, rufous ; wings infuscated, veins black. Length, 9 mm.

Habitat : Lake Forest, Ill. (J. G. Needham), and Durham, N. H. (W. & F.).

Dolerus stugnus, n. sp.—♀. Surface of the scutellar appendage transversely striate ; mesonotum with the impunctate area on the sides of the lateral lobes almost entirely wanting, at least, always separated from the median lobe by a narrow punctate area; head when viewed from above with a transverse furrow extending across behind the eyes, interrupted by an oblique ridge extending from the postocular area to the upper posterior corner of the eyes ; lateral lobes of the mesonotum not so densely punctured on the disk as at the sides ; body black, with the prothorax for the most part, a spot on each side of the median lobe of the mesonotum, the tegulæ, the knees, and the abdominal segments one to five, rufous ; wings yellowish hyaline, paler at base. Length, 10 mm.

Habitat: Ithaca, N. Y.

Dolerus acritus, n. sp.—♀. Surface of the scutellar appendage transversely striate ; mesonotum with the impunctate area on the sides of the lateral lobes almost entirely wanting, at least, always separated from the median lobe by a narrow punctate area; head when viewed from above with a transverse furrow extending behind the eyes and ocelli, and without a carina behind the eyes between the occiput and the posterior orbits ; vertex adjacent to the postocular area with a small impunctate area ; the postocular area as densely punctured as the front ; median lobe of the mesonotum not so densely punctured as the lateral lobes ; body black, with the prothorax, tegulæ, median lobe of the mesonotum, except at middle, and the abdominal segments one to five, rufous ; wings hyaline, veins black, stigma rufous below. Length, 7 mm.

Habitat: McLean and Ithaca, N. Y.

Dolerus arvensis, Say.—This species, as has been pointed out before, is the female of *Dolerus unicolor*, Beauv.

THE CHRYSALIS OF EUCHLOE LANCEOLATA, BOISD.

BY KARL R. COOLIDGE, PALO ALTO, CALIFORNIA.

The preparatory stages of but two of our species of *Euchloe* have been entirely worked out. *Genutia*, Fab., is well known, and Prof. Shull (Ent. News, March, 1907) has given us the life-history of *olympia*, Edw. The later stages of *ausonides* have also been briefly described, and Mr. E. J. Newcomer and myself have succeeded in working out its entire history, as well as that of *sara* partially. The only reference to *lanceolata* is by Mead,* in which he describes the mature larva, and makes a mention of the pupa. Later, Beutenmüller,† in his Revision of the genus, and Holland (Butterfly Book, p. 285) have compiled short descriptions of the larva, which appears to be similar to congeneric species, and with the usual glandular hairs, lateral and longitudinal markings, feeding on the flowers and buds, and later, the seed-pods of its food-plant. Mead's reference to the pupa is so meagre that I give it *verbatim:* "The chrysalis is somewhat larger than that of *A. hyantis*, and the long palpi-case is bent backwards into a sickle shape, giving the pupa a remarkable appearance." Mr. F. X. Williams has kindly given me a pupa, with a description of the larva, of a species of *Euchloe*, and as the latter agrees so well with Mead's, and the pupa differs so radically from that of *sara* and *ausonides* (both of which are known to me), I have no hesitation in referring the species to *lanceolata*. The curvature of the anterior portion of the chrysalis is especially distinctive, and for this reason it can hardly be confused with either of the other species found in the same region. Mead says of this: "In many particulars the pupa is not unlike that of *Terias nicippe*, and I believe that this species is the nearest to *Terias* of all our Anthocharis." Besides the specimen given me, Mr. Williams has three or four others, taken towards the middle of July in Shasta county, California, at an elevation of about 2,000 feet. Careful breeding will probably eliminate a number of our so-called species and varieties. *Stella*, *thoosa*, *julia* and *flora* are probably synonyms of *Reakirtii*, Edw., and *mollis*, Wright, is the same as *sara*, Boisd. *Lanceolata* is a very distinct species.

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*Psyche, II, p. 179, 1878.

†Bull. Am. Mus. Nat. Hist., 10, 236, 1898.

Chrysalis.‡—Navicular, cylindrical, slender, the palpi-case much curved, more so than in any species known to me, giving the pupa a semilunar appearance; thickest in the middle and tapering gradually therefrom to the extremities; anterior end sharper than posterior, colour at first green, changing to a very light wood-brown, very faintly streaked, and with a few scattered black points; tip of palpi-case somewhat blackish; a narrow median ventral line somewhat darker than the ground colour; lateral ridges concolorous; incisures of segments whitish. Length, 19 mm.; width, about 5 mm.

Lanceolata is one of the first species to appear in the mountains, where it ranges. Like others of the genus, it varies considerably, especially in the density of the apical coloration and the size and form of the discal bar. Northern specimens differ from southern in having the auroral spot lighter, both above and below. *Lanceolata* ranges from Mexico to Alaska, and is essentially a mountain flyer. The food-plants are various species of Cruciferæ, particularly *Arabis perfoliata*, *Turritis glabra* and *Erysimum officinale*.

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‡The pupæ of *Euchloe* seem to be very variable as to colour, and also the degree of curvature of the anterior portion. Mr. Williams tells me, however, that his pupæ are quite uniform. In *E. ausonides* the chrysalis varies greatly in the colour of the longitudinal stripes, and the tip of the palpi-case may be recurved to a noticeable extent in some specimens, while in others the curve is only moderate.

SOME WINTER INSECTS.

BY J. R. DE LA TORRE BUENO, NEW YORK.

Some five or six years ago, on Lincoln's birthday (February 12), my friend, Mr. W. T. Davis, took me collecting in Staten Island, and the CANADIAN ENTOMOLOGIST published my little sketch of the day. Every year since I have endeavoured to repeat my pleasant experience of that occasion, but never have met with success. Again I tried this year, and in spite of the two weeks of excessive cold that preceded the holiday, there were one or two things of interest to note :—

The day was bright, with a temperature at freezing or perhaps lower, and snow was quite deep on the ground. It was a day for walking, and I found myself wishing for snowshoes to go over the frozen crust. My collecting grounds are all about ten minutes' walk from my house in White Plains. First I went to a swamp, mostly under water and now covered with ice, but found nothing. Walking along the aqueduct, I kept on the look-out for likely-looking trees, but found none that gave results. Finally the Bronx River was reached, and in a field through which it runs, many specimens of the little Perlid, *Capnia necydaloides*, were found crawling actively about on the snow. Some had wandered out of the sunshine and were quite torpid, but others were very agile and endeavoured to hide under the snow crystals to avoid capture. Here also were taken a couple of undetermined gnats which were crawling over the snow. On my way home I came across two sycamores, and under the flakes of loose bark took a dozen or so *Corythuca ciliata*. In the afternoon, during a walk, I noticed a dead and peeling sapling from which on one or two other occasions I had removed a part of the bark with satisfactory results. Again I tried it, and to my satisfaction found in a part of the unbarked portion of the branches a nice series of the Aradid, *Aneurus Fiskei*, Heid. I found not only the adult, but also the ova and nymphs in several stages.

This was indeed a very different day from the other, but on the whole it was not very disappointing, considering the desultory nature of my collecting. The capture of *Aneurus Fiskei* alone was sufficient to make it noteworthy.

The Thirty-eighth Annual Report of the Entomological Society of Ontario, 1907, has recently been issued and distributed by the Department of Agriculture at Toronto to all our subscribers who have paid up their dues for the current year. Among the important papers may be mentioned Mr. Jarvis's List of the Scale Insects of Ontario, and Dr. Fletcher's Entomological Record for 1907.

THE SPECIES OF TORNOS, MORR.

BY RICHARD F. PEARSALL, BROOKLYN, N. Y.

In 1887 Dr. Hulst described (Ent. Amer., Vol. II, pp. 192 and 210) five species under this genus, vis.: *candidarius ; robiginosus*, Mor., var. *cinctarius; robiginosus*, Mor., var. *abjectarius; dissociarius*, and *incopriarius.* The first named is a Noctuid ; the second is a valid species ; the third has recently been placed as a synonym of *scolopacinaria*, Guen., in an article by Mr. J. A. Grossbeck (Trans. Am. Ent. Soc., Vol. 32, p. 342), where it most assuredly belongs ; the fourth was made the type of *Holochroa*, Hulst (Dyar, 3,821); and the fifth was in some strange manner incorporated with *Glaucina* (Dyar, 3,820). In describing var. *cinctarius*, Dr. Hulst gives no alar expanse, no sex, nor locality. Three examples of it have long been known to me, one in the Hulst coll. at N. B., the type, so labelled, from Florida ; one in the Bklyn. Inst., through the Graef. coll., from Georgia; and one taken by me at Orlando, Florida, iv, 3, 1899; all females. At that time I was confident the species was entirely distinct, and this view has since been expressed by Dr. Dyar (Proc. Ent. Soc. of Wash., Vol. 6, p. 225), but I have waited several years to make certain of it, by an examination of the male sex. Recently, through the kindness of Mrs. A. T. Slosson, I was permitted to examine her Geometrid captures in Florida, and among them were two females and one male of this species. It is easily separated from *scolopacinaria*, which is also taken there, by its large size, stouter form, broad wings, in colour a deep mahogany-red when fresh, fading into a deep reddish-brown. With the black cross lines of both wings sharply defined except the intradiscal on fore wings, which after touching discal dot fades out toward inner margin. The discal dots on fore wings are two to three times larger, and the plumes with which they are ornamented much longer, so that they wave about with the slightest movement. The ♂ antennæ are heavier. The extradiscal line is outwardly edged with a fine border of white scales. In my specimen the basal and extradiscal curved lines on hind wings are both sharply defined, and the large oval discal spot, not ornamented with plumes as on fore wings, is pupilled with a few white scales. Expanse, 30 mm.

Type : ♂ in the coll. of Mrs. A. T. Slosson.

The above comparative description, amplifying that of Dr. Hulst, applies to both sexes.

The type of (Glaucina) *incopriarius*, Hulst, passed, with the Neumogen coll., to the Brooklyn Inst. It is nearly related to *Deilinea*, but far removed from *Glaucina*. *Incopriarius* is represented in the Hulst coll. at N. B. by a species which Dr. Dyar has forestalled me in describing under the name of *errovaria* (Jour. N. Y. Ent. Soc., Vol. 15, p. 106). The type of *incopriarius* is identical with, so far as I can discern, the mutilated, badly-worn type in the Hulst coll. at N. B., representing *Aethyctera lineata*, Hulst. Mr. Grossbeck refers to this species (loc. cit., page 341) as being represented by a false type, but this was a "slip of the pen." Perhaps Dr. Barnes, from whom Hulst's specimens came, may have better ones, upon which a definite opinion might be based. Incidentally, I would call attention to the persistent misspelling of Morrison's name, *robiginosus*, by all writers, from Packard, in 1876, to the present time. The species of *Tornos*, Mor., should stand :

scolopacinaria, Guen.
    = robiginosus, Mor.
    = abjectarius, Hulst.
cinctarius, Hulst.

BOOK NOTICES.

Fauna Hawaiiensis, or the Zoology of the Sandwich (Hawaiian) Isles, Volume I, Part V, Microlepidoptera. By the Right Hon. Lord Walsingham : The University Press, Cambridge, 1907. (Price eighty shillings.)

This long-promised part of the *Fauna Hawaiiensis*, dealing with the *Microlepidoptera* of the islands, by Lord Walsingham, is now before the writer in a highly-prized complimentary copy.

Together with Edw. Meyrick's *Macrolepidoptera* (1899), it forms a monumental work on the Lepidopterous fauna of the Sandwich Isles, well worthy of the learned authors. The two volumes afford a comprehensive and authoritative key to the knowledge of this fauna, and they will ever remain indispensable classics, even though further collecting will undoubtedly add considerably to the number of species known from the islands, especially among the Micros.*

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*A material increase may particularly be expected in the more minute Tineidæ, which are scantily represented in the present work; thus, only two species of *Gracilaria* are described, and the genus *Lithocolletis* is totally absent. In U. S. National Museum is a series of *Lithocolletis* (near *Bethuniella*, Chambers), bred in Hawaii from *Lantana*, supposed to have been introduced from Mexico.

The present volume, which contains 300 quarto pages and 16 coloured plates, covers the *Pterophorina*, *Orneodina* and *Tineina*, and deals with 441 species, of which all but 35 are described for the first time.

These 441 species are distributed among only 62 genera,† confirming the theory, advanced by Meyrick, that the peculiar topographical conditions of the islands, with their numerous separate valleys, are highly favourable to specific differentiation, while the very limited area and the consequent uniform climatic conditions have not tended to increase correspondingly the originally limited number of genera.

The great majority (420) of these species and 26 of the genera are endemic to the islands. These endemic species on the whole indicate Australian rather than Asiatic or American origin of the fauna, though the total absence of *Oecophoridæ* (a single introduced species excepted) is remarkable, that being the most abundantly-represented family in the Australian region.

The remaining 21 apodemic species are mostly of wide distribution, including the cabbage moth, *Plutella maculipennis;* the tobacco and potato moth, *Phthorimæa operculella*, and the sweet potato and *Ipomea*, Miner, *Bedellia somnulentella*, besides more or less domestic species of *Endrosis*, *Monopis*, *Tinea* and *Setomorpha*.

The synonymy of one of these, *Setomorpha rutella*, Feller [evidently but lately realized by Lord Walsingham, as it is only stated in the table of distribution (page 754), and there in correction of that shown under the genus in the body of the work (page 726)], is of decided interest, and will necessitate the change of the name, hitherto used for the American specimens. Lord Walsingham recognizes as but one cosmopolitan species the original type of the genus, *rutella*, Feller, from Africa ; *dryas*, Butler, from Hawaii ; *operosella*, Feller, with its synonyms as determined by the writer, from America ; *corticinella*, Snellen, from Celebes ; and *discipunctella*, Rebel, from the Canary Islands. I have long suspected this to be the case, and heartily approve of the synonymy. A series of moths clearly determinable as *corticinella*, Snellen, was bred by the writer in 1906 from a collection of pinned Philippine insects, which was received from Manila, and which was totally destroyed by the larvæ of the *Setomorpha*. This series, including both sexes, can not be distinguished from typical specimens of *operosella*, Feller, from Texas.

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†This number must, however, be somewhat enlarged, as explained in the following.

All the genera and species are described in the careful manner characteristic of the author, and the recognition of the species is further greatly facilitated by the very excellent colored plates, representing every species. It was a joy to the writer to be able to name, without any difficulty, a dozen species from the National Museum's Hawaiian collection in as many minutes.

With all this acknowledged, it seems hypercritical to require more; yet another plate, giving delineations of the venation of all the genera, would have been a valuable addition. Not that the genera may not be recognized from the very perfect descriptions, but in any eventual rearrangement of the genera, or in comparative studies with others of other faunas, where minute details, at present not reckoned with, may have to be relied on, such a plate of careful figures of the venations would have been exceedingly valuable to the student who has not access to a good Hawaiian collection.

One striking example of this need of structural figures is the genus *Aristotelia*, of which one is surprised to find, that Lord Walsingham has retained the same abstract idea as in his West Indian paper of 10 years ago (Proc. Zool. Soc., London, 1897, page 63), notwithstanding subsequent revisional work in that group. With this originally monotypical genus, which has been limited by Meyrick and the writer to the species agreeing in venation with the type, *decurtella*, Hubner, Lord Walsingham continues to associate quite different forms. While this may not be of much importance in the case of such closely-related genera as *Chrysopora*, Clemens (*Nomia*, Clemens; *Mannodia*, Heinemann), it is decidedly mischievous with a genus like *Evagora*, Clemens, which belongs to a very different group. In this genus, *Aristotelia* (Walsingham), figures of the venation, or at least a statement of it under each species, would have greatly facilitated a revision, which must in time take place, as even the coloured figures plainly show that the included species can not be congeneric.

Lord Walsingham's arrangement of the genera in families presents some interesting new departures.

The hitherto generally accepted family, *Xyloryctidæ*, is absorbed without even a group name among the *Gelechiidæ*, probably through sound reasoning, but without any presented argumentation. To the writer it would seem expedient to retain this admittedly natural group, at least as a sub-family, with the position of vein 2 in the fore wing as the distinguishing character.

The hitherto universally-accepted family, *Elachistidæ*, Lord Walsingham finds inseparable from the *Hyponomeutidæ*, through the knowledge of intergrading Hawaiian forms. While agreeing that any divisions which cannot be well defined should be avoided as inexpedient, though not necessarily unnatural, the writer is not quite prepared for this radical move, and ventures to suggest that the final solution of this question has not been reached, and may be found, rather, in other limits being drawn, than in no limits between the two families.

In the *Hyponomeutidæ*, Lord Walsingham further places *Blastobasis* and *Endrosis*, though he has himself, within the last year, elucidated the family *Blastobasidæ* by a generic table, in which he included both these genera (Proc. U. S. Nat. Mus., XXXIII, page 200, 1907).

No reasons are advanced for this change of view, and it can only be explained on the supposition that this part of the work had been written some years ago, and has not been brought up to the author's present conception. The *Blastobasidæ*, in the absence of proof to the contrary, should be retained as a natural and easily-defined family, characterized mainly by the peculiar venation of the forewing.

The genus *Endrosis*, however, does not, in the writer's opinion, belong to this family,* but to the *Œcophoridæ*, near *Borkhausenia*.

After these radical reductions in the number of families, Lord Walsingham, on the other hand, promotes to family rank the *Carposinidæ*, as suggested by the writer (Journ. N. Y. Ent. Soc., XV, p. 35, 1907), in which he presumably will include the *Phaloniinæ* as a sub-family. With equal propriety he retains the *Olethreutinæ* and the *Tortricinæ* under one family heading, *Tortricidæ*.

He adheres to the idea, which he originated, of placing these families between, rather than in front of, the other families of the *Tineina*, which seems the more warranted in view of Meyrick's recent intermediate family, *Chlidanotidæ* (Journ. Bom. Nat. Hist. Soc., XVII, page 412, 1906); but it must be kept in mind that the *Tortricidæ* are a terminal branch, from which no other family has developed. The writer regrets

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*Nor does *Arctoscelis*, Meyrick. In his generic table, above-mentioned, Lord Walsingham differentiates these two genera on the character : no antennal pecten, a character which, if true, alone would tend to eliminate them from the family ; *Endrosis*, however, possesses a very strongly-developed pecten.

one single feature in this masterful work, namely, the erection of genera *(Ptychotrix, Catamempsis)* on secondary sexual characters alone, and this in spite of His Lordship's own statement in his remarks (page 738-9), that such characters are of very doubtful value, and especially so in the Hawaiian fauna, where the most embarrassing plasticity of such characters prevails. Undoubtedly, other sounder structural characters, common to both sexes, could have been found, or if not, the genera are, in the writer's judgment, not justified. To him it seems essential, for a sound appreciation of the natural grouping of the *Microlepidoptera*, that we get away altogether from these superficial characters, however tempting, and rely solely on the more subtle but dependable internal modifications presented in the venation.

In his discussion of the variability of the secondary sexual characters, Lord Walsingham also comments on the variability in the Hawaiian fauna of certain other, normally dependable, generic characters. Some of these the writer is not able to discuss without a more extended study of the fauna than is at present possible ; but the one case of instability of venation (in *Diplosara*, Meyrick, pages 646-7), appears to be nothing more than might be expected, or than is found in other unspecialized genera (a similar case is Monopis) ; these conditions do not in the least lessen the value of the venation as a dependable character, only the same importance must not be given to certain fluctuations in generalized families, such as the *Tineidæ* and *Hyponomeutidæ*, as would be warranted in more crystallized families, such as the *Gelechiidæ* or *Œcophoridæ*.

The few dissenting opinions on certain details that may be found in the above notes do not detract from the fullest general appreciation of Lord Walsingham's excellent work. It has been an enormous and very difficult study, and he is to be sincerely congratulated on the result, which casts great credit on the author and on his valuable assistant, Mr. J. Hartley Durrant, whose important share in the work is liberally credited by Lord Walsingham.—AUGUST BUSCK.

JOURNAL OF ECONOMIC ENTOMOLOGY : Official organ of the Association of Economic Entomologists. Concord, N. H. Volume I, No. I. February, 1908.

We are glad to welcome this first number of a new serial publication devoted to Economic Entomology. Since its formation, twenty years ago, the Association has depended upon the Department of Agriculture at Washington for the publication of its proceedings, in the form of an annual Bulletin. Some inconvenience was experienced owing to the unavoidable delay in the appearance of some of the papers, which were of immediate importance. To obviate this difficulty, and also to provide a magazine for the early publication of original observations made by workers in all departments of Economic Entomology, this Journal has been established. It is to be issued bi-monthly, beginning with February of the current year. It is hoped that not only all Entomologists will support the venture by their subscriptions, but also fruit-growers, nurserymen, horticulturists and all others in any way interested in the depredations of insects.

The number before us contains the first instalment of the papers read at the recent Chicago meeting of the Association, as well as a report of its proceedings. The eighty pages include some very interesting contributions, among which may be mentioned: Mr. Wilmon Newell's Notes on the Habits of the Argentine, or "New Orleans" Ant; Mr. W. A. Hooker's papers on the Life-history, &c., of the Ixoidea, and the Role of Ticks in the Transmission of Disease; and Mr. W. D. Hunter's discussion of the effects of temperature on the incubation of eggs of *Margaropus annulatus*. The magazine is edited by Dr. E. Porter Felt, State Entomologist, Albany, N. Y., with Mr. A. F. Burgess, Bureau of Entomology, Washington, as Asscciate Editor, and an advisory board consisting of Drs. Howard, Fletcher, H. T. Fernald, Forbes, Morgan and Osborn. The subscription for non-members of the Association is two dollars per annum, which should be sent to the Business Manager, Prof. E. Dwight Sanderson, Durham, N. H.

BULLETIN OF THE BRITISH COLUMBIA ENTOMOLOGICAL SOCIETY: Edited by R. V. Harvey, M. A., Victoria, B. C. No. 8. December, 1907.

This number contains a list of the Syrphidæ of British Columbia, by Prof. R. C. Osburn, and a continuation of Mr. Harvey's Notes on Noctuidæ, treating of five species of Autographa. This little quarterly always contains some valuable and interesting matter, and must be of great assistance to Entomologists in the Pacific province.

NOTES.

While in search of beetles last June, one of my companions drew attention to a colony of large black ants in a decayed pine stump. We noticed a great many minute yellow creatures running unmolested among the ants. Examination proved them to be Staphylinids, which I thought were of the genus Atemeles, and afterwards they were identified as such. We have been unable to learn the species as yet. The beetle is about an eighth of an inch long, and the abdomen, which is always held erect, bears a peculiar depression on the upper side in such a way as to leave a distinct ledge around the edge. Shortly afterwards we found one of the same species in a spider's web. On July 15th I was surprised to see *Cicada tibicen* with its proboscis buried in a squash bug, *Anasa tristis*. This was my first intimation that the Cicada might feed on animal matter.—ERIC MONTIZAMBERT, Port Hope.

We regret to record the death, at the age of seventy-six, of DR. H. GUARD KNAGGS, F. L. S., an English Entomologist of note, which took place on the 16th of January. He was the author of many contributions to entomological literature, among the most widely known of which is his "Lepidopterist's Guide," a third edition having been published a few years ago. This is a popular work, containing instructions for collecting, rearing and preserving Butterflies and Moths for the use especially of the young collector.

THE LAKE LABORATORY maintained by the Ohio State University announces the usual programme for the coming summer, including courses in General Zoology and Botany, Entomology, Ornithology, Experimental Zoology, Comparative Anatomy, Ecology, Embryology, Invertebrate Morphology and Ichthyology; also opportunities for research work and accommodations for investigators as in previous years. The opportunities offered are especially good for Entomology and for fresh-water conditions, and special attention is given to the aquatic life of the locality. Opportunities for research work in these directions are very favourable. Independent investigators are given the use of tables free of charge, but are expected to furnish their own microscopes and other apparatus. The locality is an excellent one for summer work, the laboratory being situated on the point separating Sandusky Bay from Lake Erie, with its frontage on a fine beach. For circulars or information address the Director, Professor Herbert Osborn, Ohio State University, Columbus, Ohio.

Mailed April 6th, 1908.

The Canadian Entomologist.

VOL. XL. LONDON, MAY, 1908. No. 5.

TYPE AND TYPICAL.*

BY HENRY H. LYMAN, MONTREAL.

These terms are used in such different senses by different authors that confusion is sometimes caused, and it is much to be desired that some authoritative body of naturalisis should accurately define their proper use, and then that all other naturalists should accept the decision and conform to it even if it does not agree with their own individual opinions.

My thoughts have been recently turned in this direction by reading the Annual Presidential Address of Mr. Charles Owen Waterhouse, read before the Entomological Society of London on the 15th of January last.

In his address Mr. Waterhouse urges, and in my opinion rightly, that accuracy and stability of nomenclature are of more importance than the observance of the strict letter of the law of priority, but we differ in our views as to the use of the word type.

Mr. Waterhouse urges, as others have done, that there should be only one type specimen for each species, and that that type specimen should be the standard for all time, while I hold that a species should never be founded upon one specimen where that can be avoided.

We agree, however, in regarding the preservation of type specimens as of the greatest importance.

Mr. Waterhouse, pointing out the different ways in which different authors use the word type, especially mentioning that some regard all the specimens which they had before them when describing a new species as types, and distribute them as such, says: "Some thirty-five years ago I saw the danger arising from this loose way of using the word, and applied the word "type" to the actual specimen described when that could be determined, and called the other examples, mentioned by an author, 'co-types.' Some years afterwards my colleague, Mr. Oldfield Thomas, proposed (P. Z. S., 1893, p. 242) the terms para-type, topo-type and meta-type, and all these are useful in their way, but we are both agreed that the word type should be restricted to the actual specimen upon which the species is founded."

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*Read before the Montreal Branch of the Entomological Society of Ontario, Feb. 8th, 1908.

Another similar term, viz., homo-type, has also been proposed, but it may, perhaps, be objected to all these terms except co-type, the meaning of which might seem to be sufficiently obvious, that a glossary is necessary to explain them, and even the word co-type seems to be used in different ways, as Dr. J. B. Smith, in his "Explanation of terms used in Entomology," explains the word as follows :

" Co-types are all the specimens before the describer when a species is named, no single one being selected as the type ; the type in such case equals the sum of the co-types."

This is using the word in a different sense from that in which Mr. Waterhouse and others use it, but it is the sense in which Mr. Oldfield Thomas defined it, Proc. Zoo. Soc., 1893, he adding : "No species would have both type and co-types, but either the former or two or more of the latter."

Para-type is defined by Dr. Smith as " every specimen of the series from which the type was selected," and it is in that sense that Mr. Waterhouse and others use the term co-type.

Meta-type is defined by Dr. Smith as " a specimen named by the author after comparison with the type," but according to Mr. Oldfield Thomas, it must also be from the original locality, and so also be a topo-type.

Homo-type, on the other hand, is " a specimen named by another than the author after comparison with the type," and topo-type is " a specimen collected in the exact locality whence the original type was obtained."

It always appears to me that any unnecessary addition to the already vast number of technical terms is to be deprecated, as imposing an additional burden upon amateurs and beginners, and it would seem to be simpler to label a specimen " compared with type " than to label it " homo-type," and when a specimen is compared with a type by anyone other than the owner of the specimen, the name of the comparer should be put on the label, as the value of such comparison is directly in proportion to the ability of the one who makes it. My objection to having a single type, when additional specimens, which are undoubtedly of the same species, are available, is that in the former case a *specimen* is described instead of a *species*.

One good specimen of a coin is sufficient for description, but insects are not stamped from dies like coins, and all species vary more or less, and if an author has before him a fair representation of the range of variation of the species, his description can be made to much better cover the species than if drawn up from a single specimen. Of course, it is of the greatest importance that all danger of having more than one species in the series selected be avoided, but even should such an error be made, the plan which I have adopted would work automatically to establish the species intended. My plan is to number all the types. The best, and what I believe to be the most typical ♂, I name type No. 1, and the best and most typical ♀ type No. 2. The others are numbered consecutively, as far as possible, according to their closeness to type No. 1. Should, unfortunately, another species be discovered among the types, it must be given a new name, type No. 1 being the final standard for the species. Should type No. 1 be unfortunately destroyed, type No. 2 would then become the final standard.

When a species is very distinct and not very closely allied to any other species, types of any kind are of minor importance, as, for instance, in the case of such a species as *Vanessa Antiopa*, the preservation of the type would be of no consequence beyond the interest necessarily attaching to a specimen described by the great Linnæus.

When the type of a species has been lost or destroyed, a topo-type might be of great importance in re-establishing the species.

In the Proc. Acad. Nat. Sci. Phil., 1862, Mr. W. H. Edwards described a species under the name of *Lycæna Pembina*. The types were brought from the shores of Lake Winnipeg by R. W. Kennicott. Unfortunately, the types were afterwards lost, and Mr. Edwards could not afterwards certainly identify anything as the same. Strecker thought he had identified it with the species later described by Grote under the name *Glaucopsyche Couperi*, but he afterwards admitted his error, and in his catalogue designated it as unknown to him. Scudder thought, after a "prolonged study" of all the N. A. Blues, that it was the same as *Lycæna Lycea*, Edw., of which *L. Arapahoe*, Reak., is accounted a synonym, but that also proved erroneous. In such a case as that, topo-types would be exceedingly valuable, and should render it possible to clear up the mystery surrounding the name.

I now come to the consideration of the word Typical. This naturally means agreeing with the type, but what type? The author's type from which he described the species, or a specimen agreeing with the general average of the species in nature? Surely it should be used in the latter sense, which is the common every-day sense of the term. Some species have unfortunately been described from aberrant specimens, but it is surely absurd to call an aberrant specimen typical of the species?

In 1863 Grote described in the Proc. Ent. Soc. Phil., a species of Tiger moth under the name *Arctia Anna*, the hind wings and abdomen being entirely black. Three months later he described in the same volume what he considered to be another species, under the name *Arctia Persephone*, in which the hind wings were yellow, with black markings, both specimens having been received from the same collector. Later it was found that they were only varieties of the same species, and though *Anna* is very rare, that name is given to the species, while *Persephone*, the common form, which probably outnumbers the *Anna* form fifty to one, is classed as a variety. Surely that is unnatural and ridiculous?

What difference could it make to Mr. Grote's credit whether we write

Arctia Anna, Grote, var. Persephone, Grote, or	Arctia Persephone, Grote, var. Anna, Grote?

While the first represents a foolish worship of the Law of Priority, the second shows the true relationship in Nature. Even had they been described by different authors, I would follow the same practice, as it would make no difference to the authors, while it would make the nomenclature agree with nature.

NEW AND LITTLE KNOWN BEES.

BY T. D. A. COCKERELL, BOULDER, COLORADO.

The genus *Nomia* doubtless originated in the Old World, where it is abundant and varied. In America it has few species, though one (*N. jenseni*, Friese) exists as far south as the Argentine. The genus may perhaps have reached America about the same time (and doubtless by the same route) as the Elephantidæ.

Nomia ekuivensis, sp. nov.

♂.—Length about 8½ mm., anterior wing 6; black, *with a strongly clavate abdomen*; pubescence dull white (not at all fulvous or yellow);

head large and broad ; front and vertex dull and rough ; face covered with hair ; mandibles dark ; antennæ dark, flagellum with a ferruginous streak at base beneath ; palpi dark ; tongue rather short, dagger-shaped ; mesothorax shining, with strong and mostly well separated punctures ; scutellum prominent but not bigibbous, very shiny, with sparse punctures; area of metathorax plicate basally ; tegulæ of ordinary size, rufo-piceous ; wings strongly infuscated in the apical field, iridescent, nervures and stigma piceous ; second s. m. nearly square, but a little oblique, receiving the first r. n. at or very slightly beyond its middle ; third s. m. large, scarcely shorter than first ; legs black, slender, tarsi brown, the hind ones quite pallid ; hind legs not modified ; abdomen shining, finely punctured, hind margins of segments depressed and with thin hair-bands ; most of fourth ventral segment depressed and covered with hair.

Hab.—Ekuiva Valley, W. Africa, 1907 *(Wellman). N. producta*, Smith, from Natal, and *N. andrei*, Vachal, from the French Congo, also have a claviform abdomen. The following table separates the males :

Clypeus greatly produced ; first r. n. joining second t. c . . .*producta*, Sm.*
Clypeus normal . . . . 1.
1. Head and mesothorax sculptured alike . . . .*andrei*, Vach.
Head and mesothorax sculptured quite differently . . . . *ekuivensis*, Ckll.

Nomia Welwitschi, sp. nov.

♂, ♀.—Length about 10 mm., black, the head and thorax with dense, coarse pubescence, strongly ochreous on thorax above, otherwise pallid ; wings strongly and broadly infuscated apically ; hind margins of abdominal segments broadly whitish or reddish, with hair-bands.

♂.—Head broad ; orbits converging below ; face broad, very hairy ; antennæ dark, ordinary, flagellum dull red beneath ; vertex with rough, dense sculpture ; mesothorax very densely rugosopunctate ; scutellum normal, rugosopunctate and dull ; metathorax with a subbasal ridge, above which is a narrow (almost linear) area, which is shining and somewhat plicatulate ; tegulæ ordinary, piceous, pallid in front ; wings reddish

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*Since writing the above, I have determined that *Nomia producta*, Smith (Tr. Ent. Soc. Lond., 1875), is not a *Nomia* at all, but a *Thrinchostoma*. For the venational characters, see Ckll., Trans. Amer. Ent. Soc., XXXI, p. 322. The name *producta* was earlier used for a different *Thrinchostoma*, so the *Nomia producta*, Sm., may be known as *Thrinchostoma nomiæformis*, n. n.

subhyaline, the apical region with a dark cloud; nervures and stigma dark, stigma small; second s. m. broad, receiving first r. n. beyond the middle; legs red, the coxæ and trochanters black, and the femora black above; anterior tarsi fringed with long hair; middle femora short and rather swollen, very shiny; hind femora greatly incrassated, concave beneath, with a sharp tooth on inner side beyond the middle; hind tibiæ enlarged, subtriangular, with a broad, blunt, apical lamina, but no tooth on inner side; abdomen broad, with hair-bands on all the segments, apex rounded, bright ferruginous.

♀.—Legs black; abdominal bands golden-fulvous.

Hab.—Ekuiva Valley, W. Africa, 2 ♂'s, 1 ♀, 1907, one of the males at flowers of *Geigeria* (*Wellman*). The species is named after Welwitsch, the well-known African traveller, who collected bees in Angola many years ago. By the clouded wings and other characters this closely resembles *N. nubecula*, Smith, from Sierra Leone, but it differs from *nubecula* by the dark mandibles (only slightly ferruginous in the middle), the dark scape, the form of the scutellum, the dark tegulæ, etc. The face is broad, whereas in *N. nubecula* (of Ckll., Trans. Am. Ent. Soc., XXXI, p. 322) it is narrow. In the form of the hind legs *N. Welwitschi* resembles *N. patellifera*, Westw., except that the tibial process is shorter and blunter.

Nomia Wellmani, sp. nov.

♀.—Length 10 mm. or a little less, robust, black, the apex of the abdomen covered with shining orange-ferruginous hair, and the hind margins of the third to fifth segments with broad hair-bands of the same colour, that on the fifth dense, those on the other two paler and thinner, very thin on middle of third; a little of the same hair at sides of second segment; all this giving an appearance just like that of the Australian *N. australica*, Smith, as seen from a little distance.

Head and thorax very densely rugosopunctate; face very broad, rather thinly covered with coarse whitish hair; antennæ black, flagellum more or less red beneath; mandibles black, with long golden hairs beneath; *tongue rather long, linear; labial palpi elongated, with the first joint longer than the other three united;* maxillary palpi slender; thorax with coarse, dull white hair; tegulæ ordinary, shining piceous, whitish in front;

scutellum and postscutellum ordinary; metathorax with a transverse subbasal ridge, very prominent, enclosing a band-like shining area which is more or less plicate; legs black, the tarsi (especially the hind tarsi) broad; anterior basitarsi, and apex of their tibiæ, with orange hair; apex of hind basitarsus fringed with bright orange hair; base of hind basitarsus above ferruginous; abdomen broad, densely punctured; wings dusky, the apical margin broadly darker; stigma ferruginous, nervures rather pale brown: marginal cell very obtuse at apex; second s. m. very broad, receiving first r. n. beyond its middle.

Hab.—Hinterland of Benguella, W. Africa, Jan. 3, 1908, taken with many other bees at a patch of flowering Compositæ, *Othonna* and *Geigeria* spp. *(Wellman).* This species is not truly congeneric with such forms as *N. ekuivensis*, but I should prefer to examine a larger series of the African species commonly assigned to *Nomia* before proposing any segregated genera.

Nomia Bakeri, Ckll., 1898.

This species was described from the male only. A female was taken by Mr. S. A. Rohwer at Boulder, Colorado, Sept. 16, 1907. It agrees with the male, except in the usual sexual characters; the tibiæ and tarsi are entirely clear ferruginous, with yellowish-white hair. The sixth abdominal segment is clothed in the middle with appressed bright orange-ferruginous hair. The wings are very yellow, with the apical margin broadly infuscated.

Calliopsis coloradensis, Cresson, 1878.

♂.—Length, 8 mm.; black, with abundant white pubescence; face, knees, tibiæ and tarsi lemon-yellow, the small apical joints of the tarsi ferruginous. The abdomen is broad and flattish, like that of a female; the hind margins of the segments are rather broadly hyaline, with thin white hair-bands. Head broad; eyes green; labrum yellow, prominent, concave, with a central dark spot; mandibles yellow except apically; supraclypeal and dog-ear marks present; lateral face-marks large, extending above level of supraclypeal mark, ending in an acute angle on the orbital margin: scape yellow in front; flagellum ferruginous beneath; prothorax yellow above; tubercles dark; wings clear, nervures and stigma ferruginous; anterior femora with the apical half in front yellow;

anterior and middle tibiæ with a black spot behind, but *hind tibiæ wholly yellow.* Closely related to *C. andreniformis*, Smith, but much larger, with a much broader face, and the femora mainly black. It is also very much larger and broader-faced than *C. rhodophilus*, Ckll.

Boulder, Colorado, at flowers of *Grindelia perennis*, Nelson, August *(S. A. Rohwer).*

Cresson's description of the male of this species is very short, but I think there is no doubt about the identity of our insect. There is in this group a curious sexual difference in the first abdominal segment, which is much more closely and minutely punctured in the males than in the females.

C. chlorops, Ckll., was based on a male of this group, easily distinguished from *coloradensis* by the colour of the legs and the smaller size. *C. coloratipes* (Ckll.) is very like *chlorops*, but the eyes in both sexes have a sort of purple colour, instead of the characteristic green of *chlorops* and *coloradensis.* The species common at Phœnix, Arizona, at flowers of Compositæ (*Heterotheca*, etc.) hitherto regarded as *coloratipes*, has green eyes, and must be associated with *chlorops,* though, perhaps, racially separable. A male from Florissant, Colorado, at first referred to *coloradensis*, proves to be *chlorops.* Two females from Soledad Canon, Organ Mts., New Mexico, *(C. H. T. Townsend)*, belong to *chlorops*, resembling the Arizona form. The females of *coloratipes*, and also those of the Arizona form of *chlorops* (in each case taken in copula with the males), have the light dog-ear marks on the face, which are wanting in *coloradensis* ♀. The more northern and typical *chlorops*, however, seems to have a female without these marks ; and at present I do not know how to separate this from *coloradensis.* There is just a possibility, perhaps, that *coloradensis* was founded on females of *chlorops* and males of the Boulder species described above.

A female which I collected at Rinconada, New Mexico, at a tall species of *Chrysothamnus*, Sept. 26, represents an intrusion of the southern type into northern New Mexico, up the Rio Grande Valley. It has the dog-ear marks very well developed ; and the lateral marks are peculiar, being broad and obliquely truncate above, with a linear upward extension quite distinct from the truncation. This may represent a distinct local race.

FURTHER NOTES ON ALBERTA LEPIDOPTERA.

BY F. H. WOLLEY DOD, MILLARVILLE, ALBERTA.

(The numbers refer to my list previously published in this magazine.)

1. *Danais archippus*, Fabr.—Both Mr. Willing and Mr. Gregson inform me that there can be no doubt that the species breeds here. It is not likely, however, that it survives the winter in any stage.

[3a. *Argynnis leto*, Behr.—I have had a few specimens sent me as this species from Utah and Idaho. The males differ from eastern *cybele* mainly in being less heavily marked with black, especially in the outer row of round spots in the interspaces, with a distinct tendency towards the gradual obliteration of all markings near the apex, and in having smaller metallic spots beneath. My only female of these is pale straw instead of pale red as in typical *cybele*, and both sexes agree well with Holland's figures. Some Calgary specimens taken since my last list was published closely approximate these, though I cannot see that they are superficially separable from the local *cybele*, as they appear to grade through. My only local female of either, taken in cop. with one of the most intermediate males, is considerably paler in colour than eastern females, but except in being much smaller, otherwise approximate them rather than my Idaho specimens. In short, what I have listed as *cybele* seems strictly referable to neither so-called species.]

4. *A. cypris*, Edw.—The species is, without much doubt, identical with *cypris* ♂ sent me from Denver, Colo., which, however, is somewhat richer in colour. The resemblance of the local form to the paler forms of *lais* is very close, and confusion is easy without a good knowledge of both. Though nearly all Calgary specimens that I have seen are a little larger, a series I took last summer on the Gleichen prairie, as well as some submitted to me by Mr. Crocker from Redvers, Sask., are decidedly smaller than Calgary *lais*. The apices are more acute, and outer margin very slightly concave instead of straight or slightly convex as in *lais*. The veins of primaries are much less prominently black marked. Another difference is in the greater length and thickness in *cypris* of the tuft of hairs on the subcostal vein of secondaries. Also, this tuft, as well as the rest of the hairs near the inner margin, show, in certain lights, a very distinct violaceous reflection, quite characteristic of the species, and not seen in *lais*. These remarks apply to the male. I have only one undoubted female, taken in cop. Other females scarcely differ, but

apparently the species is harder to separate from *lais* in this sex than in the male.

6. *A. electra*, Edw.—The separation of local material into two species as *atlantis* and *electra* is quite out of the question. *Atlantis* is strictly eastern, and as distinguished from the rest of the group is larger, has heavier black markings, including a wider outer border, and a narrower buff band beneath. Of *electra* from Colorado, its described district, I have only one pair, but cannot see any difference whatsoever from the species so widely distributed throughout the Rockies and Selkirks of British North America, including the prairie-bounding hills in the west-central portion of Alberta. The darker forms found in that region, though a bit smaller, approximate the eastern species so very closely as to make separation more than difficult. The lighter end of the series is the *lais* common on the Albertan prairies, whence this form was described. My series at present consists of sixty males and about thirty females, and I have from time to time closely examined a very much greater number. These include two males from Windermere, four from Kaslo, one from Osoyoos, four males and five females from the Rockies, along the line of the C. P. R., and the rest from various localities from the foothills to the plains, though I have none from east of Calgary, having seldom collected there during its season. My efforts to procure more mountain material have been unsuccessful. The typical prairie form is much less heavily black-marked, has lighter and more restricted brownish basal area, and less rusty-red on secondaries beneath, with a rather wider buff border. I have tried for years, but have utterly failed to draw any distinct line between the two forms, and waver between two opinions. Those are, that either *lais* is a prairie form of *electra*, merging gradually into it as it reaches the mountains, or that they are really two species, of which the extreme varieties overlap, and of which *lais* does not quite reach the mountains, though *electra* just reaches to the edge of the plains. *Lais*, however, is entered in the B. C. list, on the authority of Dr. Holland, who states that it is found in "Alberta and Assiniboia, and in British Columbia among the foothills and the lower slopes of the mountain ranges." There is sometimes a slight tendency for the prairie form to lose the silver from the marginal spots near the anal angle of secondaries, and in one specimen, taken on June 10th, an abnormally early date, the marginal row have scarcely any trace of silver whatever.

7. *A. monticola*, Behr.?—My previous record of this species was based on a single Banff male, and so far I have seen no more from Alberta. I cannot find by what authority I listed it under the name, but Dr. Skinner refers to the record in Supplement No. 1 of his Catalogue. I have a similar male from Kaslo, received as *rhodope*, but differing from Vancouver and Island specimens under that name in being slightly smaller, paler in both ground colour and shading above, and in having paler secondaries beneath, without trace of silver on any of the spots, and the marginal row slightly larger. It agrees in these details with Holland's figure (under side) and description of *monticola*, except in having more of a rusty-red and less of a purplish shading on secondaries. I recently submitted both these forms to Dr. Skinner. The coast specimens he named *rhodope*. The Banff and Kaslo specimens he says exactly fit no described form, but "are related to *zerene* and *monticola*, var. *purpurascens*." Under *rhodope*, in the Kootenai list, Dr. Dyar mentions that Mr. Cockle had the species standing as *monticola*.

8. *A. halcyone*, Edw., vel. *platina*, Skinner?—I listed the species as *halcyone* on the authority of Dr. Skinner, who had specimens from me some years ago, and who entered the record in Supp. No. 1 of his Catalogue. Of Calgary material, I have now under examination twelve males and three females, and have at times distributed a few of both sexes. Some of the females, which I had been unable to compare when writing my former notes, to my mind fit Edwards's figure of ♀ to a nicety, but both sexes show considerable variation. I have males almost the exact counterpart of mine from Colorado, 8–10,000 ft., labelled "Gore's Range," "Williams River Range," and "Pinnacle," and Dr. Skinner bears me out in associating these specimens, and now says: "They are near *platina*, and undescribed." Calgary females, however, are less like my females from the same locality. Of what Dr. Skinner tells me is true *platina*, I have a ♂ from Beaver Canon, Idaho (one of the type localities), another from Stockton, Utah, and a ♀ from Soldier Canon, Toocle Co., Utah. This series differs from the Colorado mountain series, and, in the main, from the Calgary males, in being slightly paler in all the details of colour and shading, but more distinctly in having rather larger silver spots and a wider buff band. An occasional Calgary male, however, is by no means sharply distinct. Of the only Calgary female Dr. Skinner has seen from me, he says: "Near *halcyone*, but markings darker and heavier." I have two males, from Oslar and Glenwood Springs, Colo., which Dr. Skinner

has named *halcyone*, and these differ most obviously from the local specimens in being paler in both colour and basal shading above, and lighter in markings. As to my former references to *coronis*, Behr., under this heading, Dr. Skinner tells me that the types of that species came from Mare's Island, San Francisco, now built over or otherwise spoilt entomologically. Also that Mr. Edwards's identification of the species was erroneous, and that the types having now been destroyed in the San Francisco fire, the exact identity of the species is doubtful. I took a pair in cop. at Brisco, B. C., on the Upper Columbia, about thirty-five miles below Windermere, on July 15th of last year, which are probably the same as the Calgary species. The male, however, is washed with green beneath rather than brown, and I at first mistook it for *Meadii* or *Nevadensis*, but it agrees best with the *platina-halcyone* series in other respects. It reflects brown in certain lights, which Calgary *Meadii* do not, and nearly all of the local series show a green iridescence as well as the brown, suggesting that the colour is prismatic rather than pigmentary. Another ♀, taken at the same place and time, is also greener than any Calgary specimens. The variation leads me to suspect that this species may, in some localities, sometimes be confused with *Nevadensis* or *Meadii*.

9. *A. Nevadensis*, Edw., var. *Meadii*, Edw.—In my list I recorded this species as *Nevadensis* merely, but have now decided that *Meadii* fits it better. I have compared it with four male and five female *Edwardsii* from various Colorado localities, three male *Nevadensis* from Nevada, Nevada Co., Calif., and Yellowstone Park, Wyo., and with four male and three female *Meadii*, one pair from Stockton, Utah, and the rest from Colorado. My *Edwardsii* are quite the largest of the group, and compared with the local form are rather darker, though having less of the dark basal shading above, the veins with less black, and in the females a heavier black border. Beneath there is more and richer red on primaries, and the very much darker green on secondaries (Holland says "olive-brown") encroaches much more on the buff submarginal band, so as to sometimes almost obliterate it, and the marginal silver spots differ in shape. In the Calgary species they are almost triangular, pyramidal, with the vertices generally rather sharply angled, almost dentate. In my *Edwardsii* they are more nearly rounded, with the vertices blunt. A single specimen from the Red Deer River, though pretty obviously conspecific with the rest of my series, bears some resemblance to *Edwardsii* in the shape of the spots and partial obliteration of the band.

But I have found nothing amongst north-western material examined that I can treat as distinct under the name *Edwardsii*, by which the form generally passes, and as which it was probably recorded from Alberta by Geddes. *Nevadensis* is smaller, though about right in colour, and is more lightly shaded basally, with the veins less black, and the green paler. Colorado *Meadii*, as to basal shading and black, is even a little too dark. The shape of the silver spots agrees with the local form, though the green encroaches more on the buff band, differing in this respect from *Nevadensis*. The Calgary species, however, differs rather markedly from either *Nevadensis* or true *Meadii* in the tint of the green, this being, especially in the female, almost a peacock *blue*. An exception must be made with the Stockton, Utah, pair, which approximate the local form so much more nearly than any of the rest, that I have at times rather doubted the genuineness of the labels.

17. *A. Alberta*, Edw.—Mrs. Nicholl and I met with the species in fine condition on several mountains near Laggan, far above the timber line, from July 19th onwards, in 1904. The lower spurs and shoulders of Mts. Fairview and Piran are easily accessible to an energetic amateur hill-climber (I may remark that the " hills " are a bit steep !), and good hunting grounds for this species. The ridge leading from Fairview to the Castle Crags holds the species, and is partly smooth, even ground, but dangerously precipitous on the Lake Louise side. It is best reached via the trail right up to Saddle-Back, and thence over nearly the summit of Fairview. A long low spur of Mt. Piran, on the side next Mts. White and Victoria, is also an excellent hunting ground, easy to run on, and not a bit dangerous. The insect is far easier to capture than *astarte*, and, unlike that species, the sexes were taken in about equal numbers. It usually flies close to the ground, frequently settles, and when approached does not rise quickly nor high. Mrs. Nicholl subsequently found it widely distributed between Laggan and Field. Bean records the capture of a pair on a mountain near Hector, B. C. (Edwards Butt. N. Am., Vol. III), and Mrs. Nicholl captured specimens on a mountain rising from the lower end of Wapta Lake at Hector, near Lake O'Hara, and at the very head of the Yoho Valley, the latter at about 8,000 feet. She also met with it in abundance during the latter part of July of last year (1907), on a trip from Laggan to the head waters of the Athabasca. She writes : " *Alberta* fairly swarmed in places. I got twenty-five in one day on the

slopes of Wilcox Peak. I think it prefers slate mountains, and likes steep shaly slopes. It was very common on Wilcox Pass." Her record of the species for that year is of particular interest, as Mr. Bean never met with it at Laggan except in even digited years, and believed it to be a biennial species.

18. *A. astarte*, Doubl.-Hew.—We found this on the same dates in similar situations to the last, but even more widely distributed, and the males go higher up. The extreme summits of Mts. Fairview (8,875 ft.) and Piran (8,610 ft.) both held the species in some numbers. I saw a few on Saddle Peak (7,900 feet) just east of Fairview, as late as 5 o'clock in the afternoon. A few were to be seen considerably below the peaks, but the tip-top is the favourite playground of the males. Its flight is unmistakeable. Two or three would often meet in playful gyrations, and ascend in a few seconds to a height of fifty or a hundred feet above the very highest peak, then separate as suddenly and descend in different directions, to continue their rapid, dodgy flight amongst the sometimes almost scorchingly hot rocks. I was using a short-handled, wide-mouthed net, whilst Mrs. Nicholl had a rather narrow-mouthed one, but with a longer handle. This fact, added to superior dexterity in handling it, enabled her to capture at least three to my one. All three of these peaks are composed of a huge pile of loose sharp-edged rocks and stones, varying in size from a haystack to a match-box, so the nature of the ground makes quick-stepping impossible, if not foolhardy. Some of the lower spurs where *Alberta* should be sought, and *Chionobas Beanii* is more easily captured, are more or less evenly covered with fine close-lying shale, on which even running is safe. The females were much more rarely met with, and down nearer the timber line. During that summer Mrs. Nicholl also saw *astarte* on Mt. Assiniboine, south of Banff, and at Glacier Crest, in the Selkirks. A pair of her British Columbian captures are in my collection, a ♂ labelled "500 ft. above Lake O'Hara = about 7,000 ft., July 28th," and a ♀ from "Pass to Yoho Valley, timber line, Aug. 23rd," the latter in fair condition only. Mrs. Nicholl wrote to me from Emerald Lake on 22nd, and left for the Yoho the following day, so the B. C. origin of this specimen is beyond dispute. She reports that she met with the species that summer everywhere she went in the Rockies, and says that females were not hard to stalk when sitting on a flower. She tells me that during her trip far to the north of Laggan last year (1907) her packer, Jim Simpson, caught eleven specimens on the spurs of Mt. Athabasca and

northwards, very fresh, in the last week of July. Mrs. Chas. Schæffer also records it from Mt. Athabasca, and from Mt. Temple, near Laggan, "above the saddle."

19. *Melitæa anicia*, Doubl.-Hew., var. *Beanii*, Skinner. — Not uncommon on Mt. Piran, from about 7,000 to 8,000 feet. It seems to merge into *anicia* lower down. Mrs. Nicholl met with var. *Beanii* during her trip far north of Laggan last summer.

21. *Phyciodes ismeria*, Bd.-Lec.—A worn ♀ at Gleichen station, June 29th, 1905.

22. *P. tharos*, Dru.—A form I have taken at the Red Deer River locality during early July, and which has puzzled me considerably, differs from the more usual form, which flies, equally fresh, at the same time and place, in being conspicuously marbled beneath. I considered it distinct, but Dr. Skinner says that specimens I sent him agree with some of Edwards's figures of var. *marcia*. A species sent me as *camillus* from Hall Valley, Colo., closely resembles this form beneath, but is nearer to *pratensis* above.

24. *Grapta satyrus*, Edw.—Not common. I have only five local specimens under this name in my collection. Two of them are much variegated and contrasting beneath, with the band on secondaries defined outwardly by a rather heavy black line, and a heavy G mark. A specimen from Kaslo is like this. The other three are much more uniform and darker beneath, with the band edged by a finer line, and the G also finer. One of them was bred from a larva which fed on nettle. Three specimens from Wellington, B. C., are like this. The under sides figured by Dr. Holland of both *marcyas* and *satyrus* are like the first form, and I believe I have two species.

25. *G. faunus*, Edw.—I have only one Calgary specimen, like Dr. Holland's figures, and agreeing with specimens sent me as this from Montana and B. C.

26. *G. zephyrus*, Edw.—Two local specimens agree well with Holland's figures, but are darker. One of them Dr. Fletcher has named *zephyrus*, and they are probably the same as a Colorado specimen sent me as such by Dr. Barnes. I have others of the same species from Wellington, Vancouver and Colorado.

31. *Pyrameis atalanta*, Lin.--I have occasionally bred it from larvæ found on nettle, but have never seen the imago at all common. I have observed it on the wing, presumably after hibernation, as early as May 15th.

33. *Limenitis arthemis*, Dru.—Fairly common on the Red Deer River bottoms wherever there are willows.

34. *Cœnonympha typhon*, Rett., var. *laidon*, Bork.—This, according to Dr. Skinner's Revision of the genus, is the correct name for the species, *inornata* being placed as a synonym. My tentative reference to *ochracea* proves erroneous. I have at present thirty-six males and fifteen females in my series, and have examined a large number more without being able to make two species. Many of the males that I have from the prairie round Gleichen are somewhat heavily suffused with fuscous, both above and beneath, and yet I have a paler male from there than any in my south-west of Calgary series. One of the Gleichen specimens lacks all trace of the pale bands beneath. Only one very small male (24 mm.) lacks ocelli. Nearly all others have ocellus on primaries above, usually very faint, rarely black pupilled. The corresponding black, pale-ringed ocellus beneath is usually pale pupilled, rarely obsolete. The secondaries beneath are often without ocelli, or there may be one or two small ones, and rarely traces of even four or five. None have the sub-basal ochreous patches which seem to be characteristic of *ochracea*. The females are paler than the males.

35. *Erebia discoidalis*, Kirby, has been seen as early as April 18th, 1902.

36. *E. disa*, Thunb., var. *mancinus*, Doubl.-Hew.—After a long hunt for it, with sundry chases after *epipsodea*, Mrs. Nicholl and I caught six fine specimens of this butterfly in a lightly fir-timbered swamp near the foot of the north end of Sulphur Mountain, Banff, scarcely ten minutes' walk from the Sanitarium, on July 1st last. We saw more than double that number, but they escaped by disappearing into thicker timber. It appeared to be very local, and not at all common. I think Mrs. Nicholl took a female. She subsequently met with it far north of Laggan. She writes : "I got none on the Piperstone Creek, which I think is too dry for the species. But on the Saskatchewan, in one place, I saw several, and caught two, both in bad order." That would be about the end of July.

38. *Satyrus alope*, Fab., var. *nephele*, Kirby. Most of the specimens fit Holland's figures of *olympus* better than any of the other forms. Specimens from Chicago received under this name match them pretty closely, but are slightly darker beneath, and have more ocelli on secondaries.

(To be continued.)

LIST OF HEMIPTERA TAKEN BY W. J. PALMER, ABOUT QUINZE LAKE, P. QUE., IN 1907.

BY E. P. VAN DUZEE, BUFFALO, N. Y.

(Continued from page 116.)

TETTIGONIIDÆ.

Oncometopia costalis, Fabr.—Apparently common.

Tettigonia gothica, Sign.—Taken at Temagami.

Diedrocephala coccinea, Forst.—A most beautiful species, which seems to have been abundant at all places where Mr. Palmer collected.

Dræculacephala mollipes, Say.—Taken at Quinze Lake only.

Dræculacephala novæboracensis, Fitch.—Quinze Lake. Apparently common.

Gypona Quebecensis, Prov.—Common at all stations.

JASSIDÆ.

Platymetopius acutus, Say.—Taken in numbers at Temiskamingue.

Platymetopius latus, Baker.—With the last, and at Bear Island in Lake Temagami and about Quinze Lake. This species, which I have taken in New York, Ohio, Colorado and Utah, has been a difficult form to place. The larger and paler specimens from Utah have been determined for me as Baker's *latus*, and in all essential characters they seem to agree fairly well with the description of that species. From these paler forms they run by almost insensible gradations in form and colour toward the smaller and darker *acutus*. In all, however, the vertex is longer, the oblique veins of the costa are more regularly placed, and the face is either entirely pale or but slightly infuscated exteriorly, with the basal angular pale line never entirely obsolete. I believe these should be separated from *acutus*, but whether they are the true *latus* of Baker is perhaps questionable. This species, *acutus*, Say, and *frontalis*, Van D., are common and widely distributed. The closely-allied *cuprescens*, Osborn, I have taken at Phœnicia, Colden and Gowanda, N. Y., always on springy spots among the hills.

Platymetopius obscurus, Osborn.—Barrier Lake. Two examples. This is an interesting addition to the Canadian fauna. It was described by Prof. Osborn from material taken in New York, Pennsylvania and Ohio. It has the infuscated face found in *fuscifrons*, but most closely resembles *acutus*, than which it is smaller, stouter and has a shorter vertex. Of this cosmopolitan genus fifteen species have thus far been recorded from

America, north of Mexico. Provancher's *Platymetopius acutus* is the species here identified as *latus*, while his *magdalensis* is the *acutus* of Say. *Platymetopius ornatus*, Baker, has been placed in genus *Dicyphonia* by Dr. Ball.

Deltocephalus Sayi, Fitch.—Apparently common.

Deltocephalus abdominalis, Fabr.—Five examples were taken at Temiskamingue, Quinze Lake and Barrier River. This species may be roughly distinguished from the green examples of *debilis* by their having the base of the front abruptly black.

Deltocephalus affinis, Baker.—Temiskamingue and Barrier Lake. In compliance with the now generally accepted synonomy of this species, I have applied this name to the species formerly determined by me as *Melscheimeri*, Fh.

Deltocephalus Melscheimeri, Fitch.—Nigger Point, Quinze Lake. One example. This is a smaller and more slender species than the preceding, and much less abundant.

Deltocephalus inimicus, Say.—Common at all places where Mr. Palmer collected.

Athysanus instabilis, Van D.—Temiskamingue and Quinze Lake. Three examples. These specimens are typical *instabilis*, which Osborn and Ball identify with the European *striatulus*, Fall., in which they are very likely correct, but as my material does not agree with any descriptions of that species accessible to me, I prefer for the present to place it under a name of which I am certain, leaving it to future study to settle the synonomy.

Athysanus, sp.—Two examples, representing both sexes, were taken with the preceding. This is a smaller and more slender species, which may be best distinguished by the pale gray elytra with the areoles but obscurely bordered with darker, by the conspicuously white or pale yellow margins to the black abdomen, by its having the pygofers of the female whitish, with their base and the oviduct black, and by the mostly pale legs. This is the species listed as *striatulus* in my list of the Hemiptera taken by Mr. Palmer at Lake Temagami.

Phlepsius apertus, Van D.—Three examples from about Quinze Lake. An interesting species that finds its home in the far north.

Phlepsius fulvidorsum, Fitch.—Two specimens taken with the last.

Scaphoideus immistus, Say.—Taken at White Rapids and about Quinze Lake.

Thamnotettix eburata, Van D.—Temagami. One example. In 1906 Mr. Palmer took a good series at the same locality.

Thamnotettix, sp.—Nigger Point, Quinze Lake. Two examples.

Thamnotettix inornata, Van D.—Temiskamingue and Quinze Lake.

Thamnotettix flavovirens, Gill. and Baker.—Temiskamingue P. O. and Barrier Lake. Five examples. This pretty little green species was described from Colorado, and I have in my collection a specimen from Vancouver Island. So far as I know this is its first recorded occurrence in the east.

Chlorotettix unicolor, Fitch.—Taken at all stations where Mr. Palmer collected, and apparently common.

Balclutha, sp.—Temiskamingue. One example. I have taken this species at Hamburg, N. Y.

Cicadula punctifrons, Fall.—Nigger Point, Quinze Lake. One example.

Cicadula variata, Fall.—One specimen from Temiskamingue.

Cicadula arcuata, G. & B.—Three examples taken at Temiskamingue and Quinze Lake. Last year I listed this as *Cicadula lepida*, Van D.

Cicadula 6-notata, Fall.—Barrier River. Two specimens.

Cicadula lineatifrons, Stal.—Three examples of what I believe to be this species were taken at Barrier River and Quinze Lake. These are larger than *6-notata*, with the vertex more produced. All of them have two black points on the vertex near the hind margin, very faint in one individual; and in two the basal angles of the scutellum are black, otherwise they agree closely with Stal's description. There is a transverse line on the vertex anteriorly and another on the edge of the head, both interrupted in the middle, and the commissural nervure is fuscous, broadly interrupted with white.

TYPHLOCYBIDÆ.

Empoasca obtusa, Walsh.—Barrier River. One example.

Empoasca unicolor, Gill.—Taken in numbers at all places where collecting was done. This is one of our most abundant and generally distributed species in the Northern States and Canada.

Empoasca splendida, Gill.—Two examples that certainly belong here were taken at Temiskamingue P. O. by Mr. Palmer.

Empoasca atrolabes, Gill.—Numbers of this species were taken with the preceding and at Barrier River. This species and *splendida* seem to run together by insensible gradations, not only in colour, but in the form of the last ventral segment of the female, and it would not be surprising if eventually they would have to be united, as suggested by their describer.

Typhlocyba bifasciata, Gill and Bak.—Temiskamingue and Barrier Lake.

PSYLLIDÆ.

Psylla carpini, Fitch.—Not uncommon at various localities.

Psylla, sp.—Three examples of a smaller species were taken at Temiskamingue.

SOME COLEOPTERA AFFECTING THE HONEY LOCUST.

BY C. O. HOUGHTON, NEWARK, DEL., ENTOMOLOGIST, AGRICULTURAL EXPERIMENT STATION.

On a farm near Newcastle, Delaware, there is quite a strip of honey locust (*Gleditschia triacanthos*, Linn.), hedge, which I have visited two or three times during the past two years. This hedge appears to have been injured by fire at some time, and certain sections of it are now entirely dead. Other sections are very thrifty, while between the dead and living sections may be found parts that are partly dead and partly alive.

My first visit to the hedge was on June 12th, 1906, and my attention was drawn to it owing to the large number of specimens of *Agrilus fallax*, Say, which I found upon it. Whether or not they were feeding upon the leaves I did not determine, but it seems probable that they were. At any rate, they were present in large numbers, and several were seen pairing. About fifty specimens were taken in a short time—the first of this species that I had ever seen.

Owing to the presence of such large numbers of this species on the hedge that day, I thought it probable that these beetles were breeding in its dead or dying wood, and I resolved to return to the place the next spring to collect some of this and attempt to breed *A. fallax* therefrom.

A few branches which were broken off at that time and brought home were found to contain Buprestid larvæ. One of these which I examined measured 5 mm. in length by 1.75 mm. in breadth, at the greatest width; another 6.5 mm. by 1.75 mm. The brief notes which I made on the larvæ at that time are as follows: "White; mandibles brown, tipped with black."

To illustrate the biting power of these small larvæ, one which I allowed to seize the point of a dissecting needle held itself suspended therefrom, at an angle of about 45 degrees, for a period of nearly two minutes.

No attempt was made to rear these larvæ, but on June 10, 1907, I again visited the hedge and collected a suit-case full of the wood. This was principally dead, but I made it a point not to get that which was too old and brittle, as some of it which I examined on the ground did not appear to contain any wood-boring larvæ—nor did I find any in the living wood which I secured.

This material was brought home and examined, and it was found that there were apparently several kinds of living larvæ therein. It was, therefore, cut up into suitable lengths and placed in air-tight glass jars, or glass cylinders with cotton batting at top and bottom, and set away in my laboratory. The first beetle bred from these dead branches appeared June 11, and proved to be *Neoclytus erythrocephalus*, Fab. Other specimens of this species emerged later.

On June 20 a specimen of *Clerus quadriguttatus*, Oliv., was found alive in one of the jars, and several other specimens of this species appeared later. It is probable that their larvæ were feeding upon the larvæ of some of the wood-borers in the *Gleditschia*, as most of the Clerid larvæ appear to be carnivorous. On June 24 three specimens of *Liopus fascicularis*, Harr., all alive, were found in one of the jars ; also a specimen of *Melanophthalma distinguenda*, Com., and one of *Liopus variegatus*, Hald. Another specimen of the latter species had emerged a few days earlier, but escaped.

A specimen of *Tropideres rectus*, Lec., emerged June 29 or 30. The pupal cell of this specimen had been opened when the branches were cut up. At this time it contained a larva. The pupa was observed several days before the adult emerged, but the exact length of time of the pupa stage was not determined.

On July 1 a specimen of *Ecyrus dasycerus*, Say, emerged, also one of *Phyton pallidum*, Say. Like *Clerus quadriguttatus*, this Clerid was (as a larva) doubtless feeding upon the larvæ of the wood-borers.

No specimens of *Agrilus fallax*, the species which I most expected to secure from the *Gleditschia*, emerged. However, when cutting up the branches from the jars, a living Buprestid larva similar to if not identical with the larvæ found in 1906, was found, which I thought was probably a larva of that species. At that time it measured probably about 6 mm. in length, and I thought that possibly it might soon pupate. This it failed to do, however, but continued to work in the piece of branch all summer. Wishing to determine whether this larvæ was still alive at the end of the year I followed up its burrow on Dec. 30, 1907, and soon located it. It was apparently thriving, although it had been in the dry branch in a hot laboratory all summer, and had increased somewhat in size. I have made no search for it since, but have hopes that eventually I may find a specimen at *A. fallax* in the cylinder.

This species has been recorded as affecting the locust (*Robinia pseudacacia*), but I have seen no reference to its occurrence in *Gleditschia*. Chittenden states that the habits of *A. fallax* are similar to those of *A. egenus*, and of the latter species he says: "Infests locust (*Robinia pseudacacia*), mining under the bark and twigs of the smaller branches, the beetles eating the leaves." In further notes on *A. fallax* he says: "In the National collection is a series from Central Missouri, labelled by Dr. Lugger on locust, and another series from Iowa similarly labelled by the late Dr. C. V. Riley. Among Divisional notes is one of the occurrence of what is stated to be this species under the bark of cottonwood, in July.[1]

Hopkins[2] states that this species "infests bark and wood of dying branches on living and dying Hackberry," and that adults were taken May 2 in Wood Co., W. Va.

Packard,[3] in his "Forest Insects," does not mention any species of wood-boring beetles as affecting the honey locust, but gives a list of several species of insects that feed upon its leaves. With but three exceptions, these are all Lepidoptera, the exceptions being *Lytta (Epicauta) cinerea*, Forst., *Eburia 4-geminata*, Say, and *Spermophagus robiniæ*, Sch. (The last in seeds.)

I have found the following beetles, which were presumably feeding to some extent upon the leaves, upon this plant: *Anomoea laticlavia*, Forst.; *Nodonota puncticollis*, Say; *Macrobasis unicolor*, Kirby. Other species that I have taken thereon, but whose presence was probably merely accidental, are the following: *Photuris Pennsylvanicus*, De Geer; *Chauliognathus marginatus*, Fabr.; *Statira gagatina*, Melsh.; *Mordellistena pustulata*, Melsh.

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[1] Bul. No. 22, n. s. Div. of Ent., U. S. Dept. Agric., p. 67.

[2] Bul. No. 32, W. Va. Agric. Expt. Sta., p. 184.

[3] Fifth Report of the Entomological Commission, pp. 652-654.

TWO CANADIAN SPECIES OF PSEUDOSCORPIONS.

BY EDV. ELLINGSEN, KRAGERO, NORWAY.

I received last year (1907) from Dr. J. Fletcher, Ottawa, some Canadian Pseudoscorpions for determination. The collection comprised two forms, and these two species are, to my knowledge, the first Pseudoscorpions recorded from the Dominion of Canada. This is naturally founded on the fact that these small, interesting animals have not been collected by the entomologists. In the adjoining parts of the United States, as in the States on the whole, there are many species, and even as far north as Alaska a species has been taken. This should be of interest if Canadian entomologists would draw their attention to these animals, and they would certainly make many a fine capture.

The Pseudoscorpions have much in common with the scorpions, especially as regards the palpi, but they are animals of small size—the giants among them are about 8 mm. long,—and they quite lack the tail which is so characteristic of the true scorpions. The Pseudoscorpions are to be found under bark of decayed trees, under stones and logs, among mosses, etc; some also live in buildings. Some species, especially *Chelifer cancroides*, L., are true cosmopolites, as they are easily transported from place to place in goods and the like; they are distributed throughout all parts of the earth, very few in the polar tracts and in the colder temperate regions. but in the warmer temperate tracts and in the tropical parts of the earth they are abundant. The group of Pseudoscorpions is a small group, comprising about 400 species so far described, but some of these will certainly, on further examination, fall into the synonymy of the other species, or will be only *nomina nuda*.

The two species mentioned above are the following:

Chelifer cancroides, L.

Canada: Ottawa, 8 specimens, ♂ and ♀, taken in buildings (J. Fletcher). British Columbia: Kaslo, 2 ♂'s (J. W. Cockle).

Ideobisium obscurum, Banks.

British Columbia: Victoria, 1 specimen (A. W. Hanham).

The species is largely distributed in the western parts of the United States, the States of Washington, Montana and California.

A SYNONYMIC NOTE ON CERTAIN BELOSTOMIDÆ (HEMIPTERA).

BY G. W. KIRKALDY, HONOLULU, H. ISLANDS.

This brief note is in response to my friend Mr. Bueno's mention of further synonymy, in his recent valuable paper (CAN. ENT., Vol. XXXIX, pp. 333-341).

It is now generally accepted, by workers at aquatic hemiptera, that the generic name *Belostoma* must be conferred upon the species formerly known as "Zaitha," the single species arranged under the former, at its inception, being a "Zaitha." This requires no further comment, but some consideration is necessary to select the correct name for the now nameless genus, "*Belostoma*," olim.

Stal, in 1865 (Hem. Afr., III, 179), separated, from "*Belostoma*," those forms with strongly-widened lateral margins to the pronotum (*collosicum*, etc.), under the name *Amorgius*, and unaware of previous names, I adopted this, in my recent list of Pagiopod genera, for the old "*Belostoma*," accepting *Montandonista* (1901) as a subgenus for the narrow-margined forms. There is no doubt, however, that *Lethocerus* (Mayr, 1852, Verh-Zool. bot. Ges-Wien, V, 17) is the same as *Montandonista*, and that *Lethocerus cordofanus* (l. c.) must take precedence of *Amorgiur (Montandonista) niloticus.*

Lethocerus, however, was founded on a nymph, and was therefore rejected by Mayr himself in 1863 and 1871, as well as by Stal, Montandon and Champion. But, according to the general rules of nomenclature, genera and species founded on immature stages are valid, though as a rule they are not advisable. Therefore, *Lethocerus* must be reinstated.

The following synonymy will summarize the above:

1. *Belostoma* Latreille, 1807 (type *testaceopallidum*), = *Zaitha*, Am. and Serv., 1843.

2.* *Lethocerus*, Mayr, 1852 (type *cordofanus*), = *Belostoma*, auctt., = *Montandonista*, Kirkaldy, 1901, subgen. *Amorgius*, Stal, 1865.

The species *Belostoma nilotica* (Stal, 1854) should therefore be known as *Lethocerus cordofanus*

The above is a good instance of the folly of refraining from adjustments of synonymy when their necessity is discovered. Mayr knew in 1871 that the proper name of "Zaitha" was *Belostoma*, and that that of "Belostoma" was *Lethocerus*. Those changes were infinitely easier to make 37 years ago than now, and correspondingly (or more so) easier now than 37 years hence.

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*Incorrectly included by me formerly in *Hydrocyrius*, *i.e.*, *Diplonychus.*

NOTES ON HETEROPTERA.

BY J. R. DE LA TORRE BUENO, NEW YORK.

Near my house in White Plains, N. Y., is a sunken meadow, on one side of which runs a brooklet, and on the other the Bronx Aqueduct, which carries water to New York city. The Tarrytown road bounds it at one end, and the other merges gradually into a marsh which is cut by another brook. In this meadow grows a profusion of plants, each in its season, and here insects abound in all forms. I have taken in it many interesting Heteroptera. Along the edges, at the Aqueduct, *Eurygaster alternatus* occurs. Further on, in the plants growing out of the wetter and lower portion of the meadow, in July and August I found many nymphs; some I could recognize, but two were misidentified. One was a peculiar spiny one, with an enlarged antennal joint. I *guessed* it to be *Chariesterus antennator*. To make sure, I took several full-grown nymphs home, together with one of *Archimerus calcarator*. The food problem, of course, presented itself, but the solution was found in the remains of my vegetable garden, and a bush bean pulled up by the roots and put in water in a breeding cage gave the nymphs food and shelter. They throve on the bean, and my queer capture turned out to be nothing but *Acanthocerus galeator*. This very interesting nymphal form appears to be unrecorded, and Dr. Horvath, who was in White Plains at the time, suggested that it be described.

In colour it is a checkered grey and black, quite on the dark. This nymph is very spiny. The antennæ have the first joint studded with short spines, which in the second joint become smaller and are interspersed with hairs. This joint is dark at the base and apex only, the greater portion of the middle being light in colour. The third joint is expanded into a leaf-like form, with the narrowed end at the base of the joint and the broader at the apex. This, as well as the fourth joint, is black and hairy. The latter is fusiform. The first joint is subequal to the second, and the third to the fourth, each of the latter being about two-thirds the length of either of the former. The femora are all armed with stout spines, which are practically obsolete on the tibiæ. There are six long, toothed spines on the head, arranged in pairs, and one at each anterior angle of the pronotum, the lateral edges of which are also spiny, and the disk is studded with coarse black punctures. The wing-pads are also spined on the outer edge and coarsely punctured Each of the abdominal segments has at the connexival edge two stout spines, one near the anterior angle of the segment and the other near the posterior, the latter being longer and stouter than the former. All these spines have smaller spines on them, and they increase in size caudad. There is also a series of paired spines down the middle of the abdomen, similar to the others. The dorsal stink-orifices are two in number, the anterior being between the third and fourth segments, on the suture, and the posterior similarly placed between the fourth and fifth. These orifices are quite large and noticeable, and are apparently single. The length of the nymph in the last instar, from which this description is taken, is something over 11 mm. It has the general aspect of a Coreid bug, so it can be easily recognized if taken.

While the preceding is an accurate description, it is by no means minute, although quite sufficient for recognition. The younger nymphs are very similar, except that the antennæ are comparatively much longer and slimmer, being, in fact, nearly as long as in the last nymphal instar, and the spines are also longer.

In different parts of the meadow, in the higher parts, the highly-interesting Tingid, *Melanorhopala clavata*, Stal, was taken in both the brachypterous and the very rare macropterous forms. Here also was taken *Protenor Belfragei* in great abundance, both adults and nymphs; *Harmostes reflexulus* was far from uncommon; the various species of *Euschistus* were abundant, together with *Peribalus limbolarius*, *Trichopepla semivittata*, *Podisus maculiventris*, several species of *Reduviolus*, *Alydus eurinus* and *pilosulus*, *Corimelæna atra*, *Coenus delius;* and on Alders surrounding a mud-hole *Corythuca gossypii* was very common, but darker in colour than is usual. This mud-hole, when dry, proved to be the haunt of *Hebrus concinnus*, whose white-spotted wings betrayed it as it walked about on the drying black mud.

On a hillside there is a dry meadow where timothy had been grown for hay. Here late in August *Nezara hilaris* was found abundantly along the edges. The first specimens I beat from the bushes near a gate, but other bushes along the fences gave no result. A clump of Golden-rod under some bushes was swept, and there was *Nezara*, both adults and nymphs. This was the case all along the field; one or two specimens were beaten at odd times from the trees and bushes, but the majority, as well as the nymphs, were all taken on the Golden-rod, under and near them. The nymph is light green and yellow, with the head, prothorax, wing-pads, connexivum, antennæ, tibiæ and dorsal stink-orifices more or less black. The scutellum is green, with two black round spots at the base. This is, of course, a very rough description, but having nothing but dry specimens, it is as good as can be given under the circumstances.

One day in August I noticed climbing up the trunk of a large Maple on the roadside the nymph of a *Brochymena*. This was also taken home and put in the life-cage on the bean on which it fed and throve. It finally moulted, giving a somewhat small but perfect *B. arborea*. This, in the nymph as well as the adult, had the curious habit of concealing its antennæ when at rest. They were bent under the body, and rested close to it between the coxæ, lying quite straight and parallel to the rostrum.

Near the Bronx River, in some underbrush, was swept a winged specimen of *Reduviolus subcoleoptratus*. This form is very rare, and only some six or eight have been recorded by different authors.

For some reason, winged forms of Water-striders of all genera seem to have been extraordinarily abundant in the summer of 1906, at least in this locality. *Trepobates pictus*, which even in the tropics occurs mostly wingless, gave one winged specimen. The macropterous form of *Microvelia americana* also was very common, and *M. pulchella* in one locality gave nothing but winged specimens. *Mesovelia Mulsanti* also yielded more than the usual proportion of winged individuals, and the three *Rheumatobates Rileyi* secured were in the same condition.

In the summer of 1906 my poor health compelled me to indulge in a long vacation, with bucolic joys to make time pass. I went to a little village named Fly Creek, which my friends suggested was a most appropriate abiding place for one of my "buggy" tendencies. Toward the end of August all the population of the place goes hop-picking, and my farmer-host insisted that I should lend my aid to the person he was going to work for, which I did. The hop-vines were covered with Aphids, and running over the leaves and stems in vast numbers was a black-and-white Anthocorid bug, which I have not been able thus far to determine. Its chief claim to distinction is its eagerness to insert its beak into anyone. The workers on the hop-vines kept handkerchiefs stuffed around their necks to prevent the bug from crawling under their clothes, but at the close of the day they could always exhibit a necklace of bites, shown by the red and inflamed spots where the bugs had succeeded in their purpose; at times their hands also were attacked.

NEW SPECIES OF ACORDULECERINÆ (HYMENOPTERA).

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

Acordulecera media, n. sp.—♀. Front impressed about the median ocellus, producing a more or less distinct pentagonal area; antennal fovea triangular and distinct; head black, the antennæ fuscous; the clypeus, the labrum, the mandibles, the thorax, except a spot on each lobe and the apex of the scutellum, the legs, and the abdomen, luteous; the wings hyaline, the veins, the costa and the stigma luteous; the pronotum entirely white or luteous. Length, 5 mm.

Habitat.—Algonquin, Ill. (Nason).

Acordulecera minima, n. sp.—♀. Front with short, fine pubescence, so that the head appears glossy black; pubescence of the antennæ black, antennæ black; head black, with the labrum, the clypeus and the mandibles white; the thorax, except a spot on each lobe of the mesonotum and the scutellum, the legs and the abdomen, luteous; the antennæ with the third segment as long as the fourth and fifth together; the front not impressed above the median ocellus; the antennal fovea wanting; the saw-guides exserted and broadly, roundly truncated at apex. Length, 4 mm.

Habitat —Edge Hill, Pennsylvania (G. M. Green); Ithaca, N. Y.

Acordulecera maxima, n. sp—♀. Front with a long pubescence, which conceals the glossy black colour of the head, and gives it a hoary appearance; antennæ black, with white hairs; head black, with the labrum, and mandibles white; the prothorax luteous; the mesonotum and scutellum black; the pleura and pectus piceous, and the legs and abdomen luteous; the third segment of the antennæ about as long as the fourth and fifth together; the wings hyaline; the front not impressed about the median ocellus; the antennal fovea wanting; the saw-guides retracted. Length, 5 mm.

Habitat.—Ithaca, N. Y.

Acordulecera maura, n. sp.—♀. Body black, with the clypeus, the labrum, the mandibles, the prothorax, the legs, the venter of the abdomen, and the four basal tergal segments at middle and at sides, yellow or luteous; head hoary with pubescence; the wings more or less infuscated; the saw-guides exserted, convex above and below, and broadly rounded at apex. Length, 5 mm.

Habitat.—North Mt., Penn.; Ames, Iowa (E. D. Ball); Ithaca, N. Y.

Acordulecera mellina, n. sp.—♀. Front with a median furrow, antennal fovea wanting; body black, with the clypeus, the labrum, the mandibles, the antennæ, the tegulæ, the legs, the basal half of the venter, and a large triangular spot on the middle of the dorsum at base, the apex of the triangle turned toward the apex of the abdomen, white or luteous; head covered with very fine white pubescence, appearing bare when viewed from before; notum and pleura covered with a fine pubescence; saw-guides with the two sides parallel and obliquely truncated to a point at apex above. Length, 5 mm.

Habitat.—Mt. Washington, N. H. (Mrs. A. T. Slosson).

Acordulecera mixta, n. sp.—♀. Front with the median furrow wanting; antennal fovea indicated by a minute pit; body black, with the antennæ, the clypeus, the labrum, the mandibles, the collar narrowly, the tegulæ, the legs, and the basal half of the abdomen, greenish-white or luteous; the head and the antennæ covered with long black pubescence; pubescence of the notum short, sparse and white; saw-guides broadly convexly rounded at apex. Length, 4.5 mm.

Habitat.—Columbia, Mo. (C. R. Crosby); Ames, Iowa (E. D. Ball); Delaware Co., Penn. (Cresson); Ashbourne, Penn. (Viereck); Salineville, Ohio; Ithaca, N. Y.

Acordulecera munda, n. sp.—♀. Body black, with the clypeus, the labrum, the mandibles, the pronotum and the dorsum of the abdomen more or less, piceous; the tegulæ, the hind margin of the pronotum, the legs, and the venter of the abdomen, luteous; the head and thorax fairly densely covered with long pubescence; the third segment of the antennæ about as long as the fourth and fifth together; the saw-guides broadly rounded at apex, with a distinct scopa. Length, 5 mm.

Habitat.—Ithaca, N. Y.

Acordulecera minuta, n, sp.—♀. Antennæ with the third, fourth and fifth segments subequal; body black, with the clypeus, the labrum, the mandibles, the tegulæ, the legs, and the disk of the abdomen at base, luteous; the head and thorax covered with fine, white pubescence, the cell R_1 about as broad as long, the transverse part of the vein M_2 received near its middle; wings infuscated; saw-guides broad and broadly rounded at apex. Length, 3 mm.

Habitat.—Ames, Iowa (E. D. Ball).

Acordulecera maculata, n. sp.—♀. Antennæ with the third segment considerably longer than the fourth; body black, with the clypeus and labrum more or less white; the legs, except more or less of the tarsi and the basal half of the tergum of the abdomen, more or less white; the head and thorax covered with fine white pubescence; the wings infuscated on the basal half; the front wings with the cell R_4 about as broad as long; the head dilated behind the eyes; the saw-guides very broad and squarely truncated at apex. Length, 4 mm.

Habitat.—Ithaca, N. Y.

Acordulecera marina, n. sp.—♂. Antennæ with the third segment considerable longer than the fourth; body black, with the labrum, the mandibles, the legs, and the bases of the wings, white; the head and thorax covered with short, white pubescence; the head not dilated behind the eyes; the wings wholly hyaline; the front wings with the cell R much longer than wide, and receiving the transverse part of the vein M near the middle of the cell. Length, 4 mm.

Habitat.—Salineville, Ohio.

ENNOMOS MAGNARIUS, GUENEE.

Every winter the curious egg deposits of the Notch-wing, *Ennomos magnarius*, Gn., are sent in by fruit-growers to know what they are. These eggs are very characteristic, and are like those of many other geometrid moths, somewhat quadrate or rounded oblong in shape. They are steely-gray in colour, and white at one end; about 1 mm. in length by half mm. wide, and flattened above. These eggs are laid in straight or curved lines, the eggs touching at the sides, and as a rule about 20 in a row. A female which had freshly emerged from the cocoon was found in copulation and put in a box with her mate undisturbed. During the following two days she laid 632 eggs. Although kept in the box for another three or four days, no more eggs were laid.

J. Fletcher, Ottawa.

ERRATA.

Page 100, lines 19 and 20, should read: "*Aplodes rubrifrontaria*, Pack., var. *Darwiniata*, equals *A. Darwiniata*, Dyar, a good species."

Lines 21 and 22 should read: "*Deilinia erythemaria*, Guenée, var. *pacificaria*, Pack., should be *D. pacificaria*, Pack., a good species."

Lines 29 and 30 should read: "*Selidosema humarium*, Guenée, var. *emasculatum*, Dyar, equals *Cleora emasculatum*, Dyar, a good species."

Lines 31 and 32 should read: "*Melanolophia canadaria*, Guenée, var. *subgenericata*, Dyar, equals *Mel. limitata*, Walker."

THE GEOMETRID GENUS RACHEOSPILA.

BY HARRISON G. DYAR, WASHINGTON, D. C.

Our species of this genus are badly arranged in our list. The synonymy is due to Hulst's observations on the collections of the British Museum and other foreign collections, published by him in Entomological News, VI, 71, 1895. His examination must have been very hasty, for he has obviously confused several good species under the synonymy of *lixaria*. According to his arrangement (see Bull. 52, U. S. N. M., p. 300) we have five species : *lixaria*, Guenée, with five synonyms ; *jaspidiaria*, Hulst ; *Hollandaria*, Hulst ; *viridipurpurea*, Hulst, and *saltusaria*, Hulst. Of *lixaria*, Guenée, only *rubrolineata*, Packard, appears to be a true synonym ; *inclusaria*, Walker, represents a distinct form with larger dark discal dots and strongly-developed red line in the fringe, to which *extremaria*, Walker, may be cited as a synonym if we desire to retain the name, proposed as it was for specimens without locality ; *congruata*, Walker, is evidently a synonym of *sitellaria*, Guenée (Spec. Gen., IX, 374, 1857), a species quite distinct from *lixaria*, to which also belongs *Synchlora Hulstiana*, Dyar, described as a variety of *S. Louisa*, Hulst ; finally, *cupidenaria*, Grote, is a good species, afterward redescribed as *Synchlora Louisa* by Hulst. The three following species, *jaspidiaria*, *Hollandaria* and *viridipurpurea* are all varieties of one species, which is the same as *Geometra centrifugaria*, Herrich-Schæffer, and *protractaria*, Herrich-Schæffer (Corr.-Blatt. Zool.-Min. Verein Regensburg, 1870, 182), a Cuban species. The last species, *saltusaria*, Hulst, is the same as *Eucrostis niveociliaria*, Herrich-Schæffer, also from Cuba.

Our green Geometridæ are more widely distributed in regard to their specific forms than many other groups, and all our Southern Florida species come from Cuba. I would arrange our species of *Racheospila* as follows :

1. lixaria, Guenée.
    rubrolineata, Packard.

2. inclusaria, Walker.
    extremaria, Walker (?)

3. sitellaria, Guenée.
    congruata, Walker.
    indeclararia, Walker.
    Hulstiana, Dyar.

4. cupidenaria, Grote.
    Louisa, Hulst.

5. centrifugaria, Herr.-Sch.
    protractaria, Herr.-Sch.
    Hollandaria, Hulst.
    jaspidiaria, Hulst.
    viridipurpurea, Hulst.

6. niveociliaria, Herr.-Sch.
    saltusaria, Hulst.

BOOK NOTICES.

ANNALS OF THE ENTOMOLOGICAL SOCIETY OF AMERICA. Published quarterly by the Society. Herbert Osborn, Managing Editor, Columbus, Ohio, March, 1908.

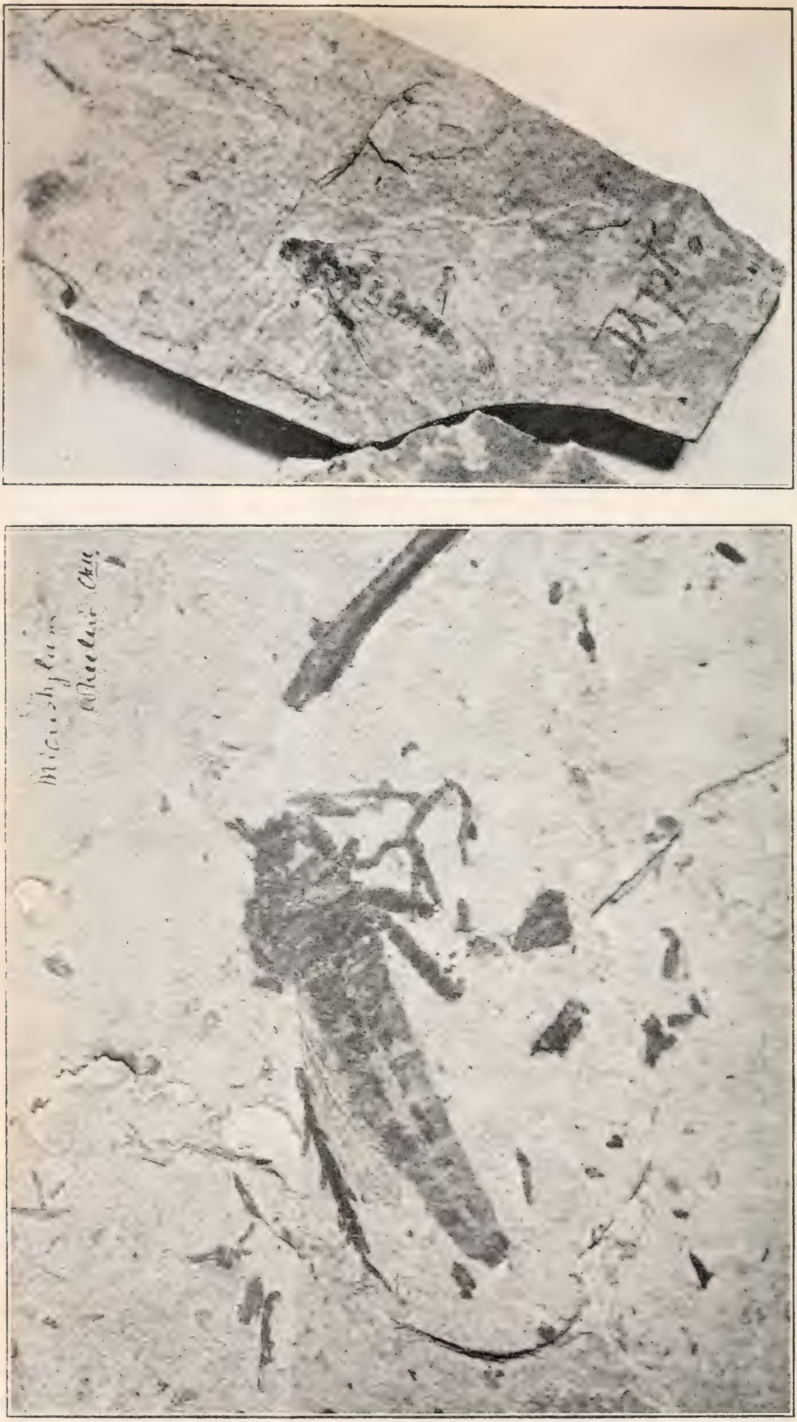
The five hundred members of this new international Society must, we feel sure, be pleased with the initial number of their Annals ; it is so beautifully printed, so respectable in form, and so excellent in its contents, that we must all be proud of it, and should be willing to do all in our power to maintain its high character, and give it all needful support. The number contains the Constitution of the Society, a list of the Officers, Fellows and Members, and an account of the proceedings at the three meetings thus far held in the great cities of New York, Boston and Chicago. The remainder of the issue includes a most interesting paper on the Polymorphism of Ants, by Prof. W. M. Wheeler, and a discussion of the Habits of Insects as a factor in Classification, by Prof. Herbert Osborn. The chief feature of the number is, however, the charming photograph of our dear old friend, Dr. Samuel H. Scudder, which we are delighted to have, and which must be equally welcome to every one of the members of the Society.

The subscription price of the Annals is one dollar per annum to members, in addition to their yearly dues, and $3 00, with the extra postage needed, to outsiders.

JOURNAL OF ECONOMIC ENTOMOLOGY : Official organ of the Association of Economic Entomologists. Concord, N. H., Vol. I, No. 2, April, 1908.

This second number of the Journal contains nearly all of the remainder of the papers read at the annual meeting in Chicago ; the four numbers to follow will, therefore, furnish a large amount of material which could hardly have reached the public but for this new enterprise. The numerous papers now presented are full of useful and varied information, and are of much interest to all workers in the field of entomology. As time goes on this Journal will become a veritable storehouse of practical information for biological students, as well as those who are engaged in the cultivation of food products, cotton and other raw materials, or who are interested in the manifold relations of insects to the health and comfort of animals and man. It occupies a field of its own, and does not trench upon the domain of any existing periodical ; it deserves to have a wide circulation and an ample subscription list.

Mailed May 8th, 1908.


Microstylum Wheeleri Ckll.

FOSSIL DIPTERA.—DIALYSIS REVELATA, CKLL., AND MICROSTYLUM WHEELERI, CKLL.

The Canadian Entomologist.

Vol. XL. LONDON, JUNE, 1908. No. 6.

TWO FOSSIL DIPTERA.

BY T. D. A. COCKERELL, UNIVERSITY OF COLORADO.

The finest fossil insect found at Florissant by the expedition of 1906 was a large and excellently-preserved Asilid fly. Although several fossil Asilidæ have been described from Europe, only one species (*Stenocinclis anomala*, Scudder, from Wyoming) has been described and named from the American tertiaries.

Microstylum Wheeleri, n. sp.

Length about 40 mm., of which 14 or a little less is head and thorax; wings rather short, about 20½ mm. long, faintly dusky, the veins dark; head and thorax black; legs very dark brown or piceous; abdomen reddish-brown, with triangular black markings on the first four or five segments, as shown in the figure; antennæ stouter than in *M. morosum*, Loew. The general form and proportions are shown so well in the figure that they need not be described. (Plate 4.)

The venation appears to accord sufficiently well with that of *Microstylum*. The radius and radial sector are quite normal, the latter branched as in *M. morosum*; radiomedial cross-nervure present and normal; the cell between the ultimate branches of the media is essentially as in *M. morosum*, the upper branch being even more bowed basally, *but the end of the upper branch reaches the margin a considerable distance from the lower branch of the radial sector;* cell V_3 (Comstock's Manual), which I consider to be enclosed within the branches of the cubitus (following my interpretation of the venation in the Nemestrinidæ), is spindle-shaped, with the upper margin not far from straight, but the lower strongly bowed; from its apex it sends a cross-nervure to the media, reaching the latter at the point of forking, and a straight nervure (end of the cubitus according to my interpretation) to the margin; there was no doubt a cross nervure passing from its lower side to the margin, but this place is obliterated; the cubital cell (viii, Comst.) is very narrow.

According to my interpretation (Amer. Jour. Sci., April, 1908) the strong bend in the upper branch of the media is perhaps a relic of a condition in which a cross-nervure (found in most Nemestrinids) passed from thence to the radial sector; no trace of this now remains.

Hab.—Miocene shales of Florissant, Colorado, Station 14 (*T. D. A. Cockerell*, July 8, 1906). The genus *Microstylum*, Macquart, has at present four species in our fauna; two from Dallas, Texas; one from Pecos River, on the borders of Texas and New Mexico, and Kansas; and one from Mexico. The fossil is named after Dr. W. M. Wheeler, in recognition of his important contributions to dipterology, and in remembrance of the fact that he was present when it was found.

Proctacanthus Philadelphicus, Macq. (specimen from Mesilla Park, New Mexico, caught preying upon a honey-bee), compared with *M. Wheeleri*, shows the following important differences in the venation:

1. The cell in the forks of the radial sector is conspicuously longer and narrower.

2. The apex of cell 1st V_2 (Comst.) is rather broadly contiguous with the base of cell V_1, or, in other words, the lower branch of the media is sharply angled at the base, the point emitting the cross-vein to cell V_3.

3. Cell V_3 (enclosed within the branches of the cubitus, according to my view) is cuneiform, pointed basally, but broadly obliquely truncate apically, and connected with the margin by only one nervure.

Dialysis revelata, n. sp. (Leptidæ).

Length, 18⅔ mm.; proportions about as in *D. rufithorax*, Say, except that the abdomen is somewhat longer; head small, diam. 2 mm. or a fraction over, appearing black; thorax reddish-brown (perhaps ferruginous in life), diam. 4 mm.; abdomen pale reddish-brown, with whitish bands at the bases of the segments, the second and third especially having about the basal half whitish; wings ample, about 13⅓ mm long, the nervures pale ferruginous; anterior legs pale reddish; middle and hind femora dark brown or black, but their tibiæ and tarsi paler; length of hind femora about 6 mm., of middle femora, 5½ or a little more.

Venation like that of *D. elongata*, Say (*dissimilis*, Walker), as figured by Williston from Austen's drawing (Kans. Univ. Quarterly, April, 1895, p. 264), except as follows:

1. The subcosta reaches costa about 8 mm. from base of wing, thus considerably beyond the middle.

2. Vein R_{2+3} (following the nomenclature of Comstock and Needham, Amer. Naturalist, XXXII, p. 233) is strongly bent downwards where R_{4+5} leaves it. (Such a bend is slightly indicated in *Leptis*.)

3. The discal cell is longer; on its upper side, the part beyond the cross-nervure to the radius, is much more than twice as long as that before it.

4. The cell M_3, or fifth posterior (cell in the forks of the cubitus, according to the nomenclature proposed by me for the Nemestrinidæ), is present, and rather widely open at the apex.

5. The cubital cell (Comst. and Needham) is also open at the apex.

It has been shown by Mr. C. W. Johnson (Ent. News, 1897, p. 118) that the presence of the fifth posterior cell is not a generic character in this group, since in *D. rufithorax* it is present or absent, without even specific difference.

Hab.—*D. revelata* is from the Miocene shales of Florissant, Colorado, at Station 14 (*W. P. Cockerell*, 1907). I submitted a drawing of this species to Prof. A. L. Melander, and it is to him that I am indebted for the suggestion that the species belongs to *Dialysis*. It is remarkable for its large size, and some venational characters above indicated, but I cannot find any sufficient reason for regarding it as another genus. The characteristic flexure of R_4 is exactly as in *Dialysis*.

This is the first American fossil Leptid. Of Leptidæ in the broad sense (including Xylophagidæ) numerous species have been described from Baltic amber, but only one (*Xylophagus pallidus*, Heer.), from other rocks, namely, from Aix. All of the European fossil Leptids are from the Oligocene.

NOTES ON TENTHREDINOIDEA, WITH DESCRIPTIONS OF NEW SPECIES.

BY S. A. ROHWER, BOULDER, COLO.

Paper I (Species from Colorado).

The term middle fovea is used in these descriptions, and I expect to use it from now on, for the fovea between the antennæ. This is what Mr. C. L. Marlatt (Rev. of the Nematinæ of N. Am., Tech. Ser., No. 3, Dept. of Agriculture) calls the antennal fovea. The term antennal fovea in my descriptions from now on will mean the fovea at the base of each antenna. "Ocellar basin" is the basin in which the lower ocellus is placed. "Middle carina" is the carina that is sometimes found between the antennæ.

I am greatly indebted to Prof. C. P. Gillette for the loan of the Saw-flies belonging to the Colorado Agricultural College. Also to Prof. T. D. A. Cockerell for many valuable suggestions, and to Dr. A. D. MacGillivray for permission to describe some Saw-flies which he had named in manuscript.

It is my plan to have a series of papers on Saw-flies, in some cases giving notes and descriptions of new ones, and in others giving tables of the species of America, north of Mexico.

Euura brachycarpæ, n. sp.—♀. Length about 5 mm. Head with a few fine punctures on vertex. Clypeus shallowly emarginate, lobes broad, rounded, antennal foveæ large and deep; middle fovea (antennal fovea of Marl. Rev. Nematinæ of N. Am.) elongate, well defined, ocellar basin shallow, better defined by the lower wall; a slight depression around each lateral ocellus; 2nd, 3rd, 4th, 5th joints of antennæ subequal; thorax smooth, shining; tarsal claws cleft, rays subequal; intercostal vein its own length before basal; discal cells of hind wings equal on the outer margin, the lower one is much broader than the upper; sheath broad, rounded on lower apical margin; cerci long and slender; apex of abdomen and sheath with long white hairs. Colour shining black; mandibles, except apex, which is piceous, labrum, edge of clypeus, tegulæ, small spot on angle of pronotum; legs, except bases of coxæ and a line on femora, beneath clear reddish-yellow; apex of venter is sometimes piceous; wings hyaline; nervures brown; costa and base of stigma pallid.

The ♂ does not differ much from the ♀; the apical joints of the antennæ are rufous, the costa is darker, the femora are usually darker, the posterior are sometimes piceous, and the posterior tarsi are usually infuscate.

One ♀ has the posterior and upper orbits ferruginous, and the superclypeal area and whole of clypeus reddish-yellow. The upper orbits in a good many specimens are rufous.

Hab.—Florissant, Colo., between June 16 and July 24, 1907, but mostly on July 7, '07, when the type was collected. "On *Salix brachycarpæ*" (S. A. Rohwer). An Euura gall, common on this Salix at Florissant, and the only one I found there is much like *Euura salicis-ovum*, and I think it must be the gall of *Euura bachycarpæ*, although no adults were raised.

This species is most nearly related to *E. albiricta*, Cress., but may be known from that species by being larger, having no testaceous spot between eyes, the posterior angle of pronotum being reddish-yellow, and the black of the femora in the ♀ being a line beneath.

Euura parva, n. sp.—♀. Length about 3½ mm. Head with small, rather dense punctures, vertex rounded; clypeus circularly emarginate, lobes broad, rather pointed; antennal foveæ rather deep, longer below antennæ; middle fovea elongate open at the top; ocellar basin very shallow at the top, but fairly distinct nearer the antennæ; 3rd and 4th joints of the antennæ equal, next two equal and the last three subequal; thorax with fine dense punctures above, smooth beneath and on sides; tarsal claws minutely cleft, rays equal; venation normal, lower discal cell wider than upper, the lower and upper equal on outer margin; sheath broad, rounded on lower apical margin; cerci long and rather stout; sheath clothed at apex with hairs. Colour dark brownish; clypeus, labrum, mandibles, except tip, cheeks, orbits, tegulæ, posterior angles of pronotum, all of the legs, venter and sheath reddish-yellow, the abdomen above of the paratype is pale piceous; antennæ beneath and apical joints dull ferruginous, wings hyaline, nervures pale brown, costa and base of stigma paler.

Hab.—Ft. Collins, Colo. Type collected April 24, 1906; paratype May 21, 1906.

This species seems quite distinct, and is easily distinguished by its small size from all except *albiricta*, Cress., from which it may be known by the more abundant pale markings.

Cephaleia punctata, n. sp.—♀. Length about 12 mm. Head almost as wide as thorax, much broader above than beneath; eyes placed well forward; vertex very broad, flat; a broad low carina between antennæ and on basal part of clypeus; clypeus truncate, broader on the lower part; left mandibles tridentate, right bidentate, inner tooth largest; antennæ long, slender, extending somewhat past the base of abdomen, first joint wider and about three times as long as second, third longer than four + five; ocellar region with dense deep punctures; vertex and sides of head with deep, scattered punctures; lateral lobes of mesonotum and scutellum with deep, scattered punctures, similar to those on the head; mesepimera with deep punctures on lower and extreme upper part, the middle somewhat corrugated; metathorax and abdomen smooth; claws with an inner tooth about one-third from apex; four hind tibiæ with a pair of spurs about one-fourth (or more) from apex, and another single spur about a fourth above these; second transverse cubital uniting with radius about one-third of its length beyond transverse radius. Colour shining black; anterior margin of clypeus, a line in middle, inner orbits broadly, large spot on upper inner orbit, cheeks, broad band on side of head, extending from cheeks to occiput, where it joins with a crescent formed by a line from top of eye to occiput, then curving downward, crescents uniting, the lower outside part of crescent is a thin line, so that on one side there is a break, two large elongate spots on vertex (the heavier marking of the vertex and occiput together form a sort of M, the outer lines being heavier), posterior margin of pronotum, tegulæ, triangular spot on anterior lobe of mesonotum, posterior and lateral half of lateral lobes of mesonotum and base of scutellum, these form a broad U, to lines on under side of prothorax, broad band on mesepimera, line above posterior coxæ, light yellow; abdomen, except a black spot on apex of venter around sheath, and sheath, legs from apex of femora, mandibles, antennæ from first to about twelfth joint, rufous. Wings somewhat fuscous, a band from base of stigma across wing to the apex of second discoidal cell and posterior margin fuscous; nervures brown, stigma at apex and base of costa lighter.

Habitat.—Florissant, Colo., July 12, 1907. (S. A. Rohwer.)

This species may easily be separated from the other members of this genus (*C. Canadensis*, Nort.; *C. Quebecensis*, Prov., and *C. ochreipes*. Konow gives *ochreipes* as a syn. of *Canadensis*, but I believe it to be distinct) by the triangular and U-shaped spots on upper side of mesothorax. I have gone through all the descriptions of the N. Am. species of the genus Lyda in the Cressonian sense, and it is none of those, although in coloration it is nearer some species assigned by Konow to other genera than that in which this species is placed. It belongs to the sub-genus *Cephaleia*, as given by Konow in the "Genera Insectorum."

Emphytus Gillettei, n. sp. (= *E. Gillettei*, MacG., M.S.).—♀. Length about 8 mm. Form similar to *E. mellipes*. Head smooth, with a few small punctures; ocellar basin with sloping walls, almost united with the middle fovea, the walls of which are not as sloping; antennal ridge prominent, extending into clypeus; clypeus deeply, angularly emarginate, as long as the second joint of antennæ; a furrow from base of each antenna to occiput; a furrow between lateral ocelli; middle fovea large; four apical joints of antennæ constricted at base, third joint a trifle the longest, four and five subequal; thorax, in general, punctured like head; angles of pronotum, scutellum and postscutellum with denser and larger punctures; lower part of pronotum and a spot on mesepimera at side irregularly roughened; first joint of tarsi as long or a little longer than 2 + 3; inner claw tooth long, making the claws look bifid; transverse radial curved, received in middle of cell; second recurrent nervure in basal third of second cubital; lanceolate cell of hind wings shortly petiolate at apex; abdomen with fine, rather dense punctures; sheath broad, obtusely pointed at apex above, rounded beneath. Colour black;

apical joints of antennæ and mandibles, except base, dark rufous; tegulæ, cenchri, spot on middle of basal plates above, two spots on fourth abdominal segment above (these spots are sometimes confluent and form a band above), trochanters, extreme apex of posterior coxæ, a small band on posterior tibiæ at base, white; palpi, anterior tibiæ and tarsi beneath, intermediate tibiæ and tarsi beneath somewhat, pallid or pale testaceous; posterior femora, tibiæ and tarsi yellow-red; tibiæ and tarsi infuscated; pleura with short white hair. Wings dusky-hyaline; nervures and stigma dark brown.

Habitat.—Colorado, May 21, 1901; also specimens from Denver, Colo., May 30, 1902, and one from Boulder, Colo., May 17, 1902. (S. A. Johnson.) Specimens and type in collection of Colo. Ag. College.

The posterior legs are sometimes darkened, but there is always a strong rufous tinge. The sculpturing of the head varies somewhat, but the markings are always present, although sometimes faint.

This species seems to fall between *E. mellipes*, Harris, and *E. cinctipes*, Nort. It may be known from *E. mellipes* by the dark, almost entirely black, four anterior legs, the white on the fourth abdominal segment not going all the way round, etc. From *E. cinctipes* by having the posterior femora and tibiæ yellow-red, stigma unicolour, etc.

Emphytus Coloradensis, Weldon.—(CAN. ENT., Sept., 1907, p. 304.) The following notes may be useful in determining this remarkable species. They were made from the type, which is a male. Head densely punctured; clypeus emarginate; antennæ stout, joints somewhat rounded out beneath, rather short, malar space distinct; thorax punctured, but not as densely so as head; claws simple; transverse radial joining the radial nervure beyond the second transverse cubitus; wings subhyaline. Length about 5 mm.

This species is quite distinct from all American ones.

Habitat.—Little Beaver Creek, Larimer Co., Colorado, July 4, 1896 (C. P. Gillette). "Taken above timber line, 11,500 ft. altitude."

Hoplocampa bioculata, n. sp. (= *H. bioculata*, Macg., M.S.), ♀. Length about 5 mm. Head not as wide as thorax; vertex rounded; covered with very small dense punctures; antennæ placed in two deep, large foveæ, which extend to clypeus; the middle fovea small, but quite distinct; third, fourth and fifth antennal joints subequal; clypeus broadly, angularly emarginate, lobes broad, rounded; labrum rounded at apex; thorax with fine dense punctures above, almost smooth beneath; intercostal vein more than its own length basal to basal vein; lanceolate cell of hind wings longly petiolate at apex; upper discal cell extending beyond lower; claws simple, first tarsal joint of intermediate legs nearly as long as joints 3 + 4 + 5; sheath broad at base, pointed at apex above, rounded below. Colour black; clypeus, labrum, mandibles, except at apex, lower orbits and tegulæ, luteous; palpi, spot on upper orbits, antennæ beneath, tibiæ and tarsi reddish-brown (the density of this colour varies somewhat); anterior femora sometimes the colour of the tibiæ. Wings hyaline; nervures and stigma pale brown, stigma lighter in middle.

Habitat.—Dixon Canon, Larimer Co., Colo., May 9 (C. P. Gillette); also specimens from Ft. Collins, Colo., May 11, 1899; 2 ♀'s, Foothills, near Ft. Collins, Colo., May 15, 1897, flowers of *Amelanchier alnifolia* (C. P. Gillette); 1 ♀, Dixon Canon, Colo., May 6, 1894 (C. F. Baker).

This species is quite distinct. It seems nearest to *H. obtusa*, Klug., from Georgia, from which it may easily be separated by the colour of the basal plates, etc.

Lycasta fusca, n. sp. (= *L. fusca*, MacG., M.S.). ♂. Length, 6 mm. Head a little wider behind eyes; vertex broad; malar space distinct; clypeus broadly emarginate, lobes small, pointed; labrum slightly emarginate; superclypeal space depressed into a furrow; middle fovea distinct, broadening above, where it is joined by two furrows, which come from inner orbits and extend to vertex; ocellar basin small, but well defined; antennæ reaching about to apex of scutellum, third joint distinctly longest, last six subequal; thorax, as is the head, with fine punctures; punctures on scutellum and postscutellum well defined; tarsal claws simple; transverse radial received in apical third of cell; lanceolate cell shortly contracted, or with a very short broad cross nervure; lanceolate cell of hind wings petiolate at apex; abdomen with irregular small punctures; seventh ventral segment broadly rounded at apex. Colour black; face below antennæ, pleura and legs with sparse, short gray hair; antennæ with very short, sparse gray hair; in two specimens the anterior tibiæ and tarsi are pallid beneath, infuscated. Wings dark fuscous, shining in certain lights with green and crimson; nervures and stigma black.

Habitat.—Ft. Collins, Colo., June 4, 1899; also June 4, 1901, and Horsetooth Gulch, Larimer Co., Colo., April, 1895 (C. P. Gillette and C. F. Baker). Collection of Colo. Agric. College.

This species is quite distinct from all other members of the genus, and may be easily known by being entirely black.

FURTHER NOTES ON ALBERTA LEPIDOPTERA.

BY F. H. WOLLEY DOD, MILLARVILLE, ALBERTA.

(Continued from page 156.)

39. *Chionobas Macounii*, Edw.—During June (22nd–24th), 1905, Mr. Hudson and I came across the true habitat of this species. About ten or twelve miles west of here, in the "Billings's Mill" locality, is where we had occasionally taken a few specimens in previous years, flying near the foot of the spruce-covered hills. Most of the hills are heavily timbered on the north slopes, the spruce timber merging into poplar scrub at the summit, and the southern slopes are grass-covered and void of timber. Amongst the poplar scrub, and at the edge of the spruce, is where we found both sexes quite fresh, the males comparatively common, on the above dates. The light colour of the upper side makes it a more conspicuous object than *jutta* when on the wing, and though, perhaps, just as shy of approach, its flight is rather slower, and it usually settles on fallen timber instead of high in standing trees like that species. The difficult nature of the ground prevented our taking more than we did. Some males show a decided tendency to develop a sex-mark, thus showing a closer relationship to *gigas* than was previously supposed. *Jutta* was common at the same time, in amongst the timber, and usually at the foot of the hills, where *Macounii* was far less often seen.

41. *C. Alberta*, Elwes.—For "below the cell," in line 12, read "opposite the cell." The species has been very scarce of recent years.

42. *C. varuna*, Edw.—Mrs. Nicholl found this species common on the Kootenai Plains, near the head of the Saskatchewan, in mid-July.

44. *C. Beanii*, Elwes, = *subhyalina*, Edw.—Mrs. Nicholl and I found this common on the only three peaks we visited near Lake Louise, Laggan, on July 19th and 20th, 1904. These are Mts. Piran, Fairview and Saddle Peak. (For altitudes vide under *astarte.*) We saw it then only on or very near the extreme summits, though Mr. Bean writes in Edw. Butt. N. Am., III: "Its observed range of altitude extends from 7,300 ft., for occasional stragglers, timber-line at Laggan being 7,000 ft., to 8,500 ft., as the males habitually frequent rock wastes at the points and ridges of the peaks. The females seldom reach such localities, but chiefly inhabit sedgy slopes in a belt of altitude between 7,500 and 7,800 ft." We met with but few females, but one from Fairview on 19th is labelled "Near summit; over 8,500 ft." Mrs. Nicholl found it common on all

the high peaks of the Rockies, where she collected during that season, and says: "I never found the female lower down, as was the case with *astarte*." She also met with it commonly during her trip far north of Laggan last summer. On July 16th last I caught nine specimens on Piran, including one or two females, during cold weather, with very little sunshine. During a short glimpse of shine, if one did not get up in sight of its own accord, I could occasionally stalk one up, and marking it down, often found it sleepy and easy to catch. One that I marked, I dug out from amongst the stones nearly two feet down. On this occasion I saw more on the lower ridges at approximately 8,000 feet, than at the extreme summit, and there is much easier footing. On the 18th, warm and sunny, I found it fairly evenly distributed, though scarcely common, all over the southern and eastern slopes of the mountain for about 7,500 feet up, but confined my attention more to other species. But late in the afternoon I took a female, in probably her first flight, within 200 feet of Lake Agnes, that is, below 7,000 feet and within the timber line. I should mention that this was during an abnormally late season. I believe, however, that the summits may produce insect life earlier than the lower levels, as the snow often goes from these first, and the rock-piles radiate the sun's heat tremendously. In hot weather it is rather shy, but does not make very long flights. With caution it is easily stalked. I have also taken this species on Mt. Stephen, Field, July 7th, Mt. Field on the 8th, and saw one settle close to me on the summit of a mountain about eight miles south-east of Windermere, B. C. This was probably not above 7,000 feet, as timber just reaches the summit. Specimens that I have seen in Pacific Coast collections from Mt. Cheam are a little shorter in wing than the Rocky Mountain form, in this respect resembling *Brucei*. I am indebted to Mr. Taylor for one of these specimens.

46. This is *Thecla iroides*, Bdv., according to Mr. Cook. I have compared a short Calgary series with specimens labelled *iroides*, from Kaslo, Victoria, and Wellington, B. C., and they differ only slightly in colour, the B. C. specimens inclining more to purple or violet beneath. Some local specimens match them very closely, however. Dr. Dyar says: "As between the two I should call your Calgary species *augustus*." Mr. Cook claims, in CAN. ENT., XXXIX, p. 146, that the two are separable by early stages. My dates are from May 12th to 29th. Mrs. Nicholl records it from Banff in May.

47. This is the form described by Messrs. Cook and Watson as *Incisalia polios* (CAN. ENT., XXXIX, 202, June, 1907), and some of my few specimens agree well with their figures on Plate 5 (July). It is stated after the description that "*Polios* most nearly resembles *Mossii*, Hy. Edw., from which it differs in the presence of the hoary margin of the primaries, the broad hoary area of the secondaries, . . . and in the colours of the fringe." And further: "Undoubtedly *polios* has been confused by collectors with *irus*, *Henrici* or *Mossii*," and comparisons are made with these species. Dr. Skinner, in Ent. News, XVIII, 327, says: "I do not consider it specifically distinct from *T. Mossii*. . . . . The species extends across the continent from the Atlantic to the Pacific, ... and the type (♂, *i. e.*, of *Mossii*) comes from Esquimault, V. I." My dates are from May 5th to June 29th. The latter date is exceptionally late, but the specimens are in fine condition.

50. *T. titus*, Fab.—Red Deer River, July 25th and 26th, 1907, not rare.

55. I have described this form as *arethusa* in CAN. ENT., XXXIX, 169, May, 1907. It appears to be somewhat local, as I have not so far met with it elsewhere than in the two localities mentioned under the description. A few days after taking a series near Billings's Mill, I spent an afternoon hunting closely for it over what appeared to be precisely similar ground ten miles distant, without finding a specimen. Dates of capture, July 5th to 20th. Dr. Skinner writes to me: "I consider it a variety of *phlæas*, and nearer to that than var. *Americana*." He had previously listed the form as *phlæas* in Sup. 1, page 18, of his Catalogue. Mrs. Nicholl came across it far north of Laggan, and I am indebted to her for three pairs, labelled "Brobokton Creek, July 5th–13th, Aug. 12th, 13th," and "Brazeau Creek, July 16th." One ♀ is my *arethusa* exactly, but some of the rest approximate the eastern form very closely, one ♀ being inseparable therefrom. Mrs. Nicholl took other specimens, and Sir George Hampson says they are like a form he took in Norway. I certainly have a very similar male labelled "Norway sept.," which is the only European specimen sent me by Bang Haas as *hypophlæas*.

56. *Chrysophanus Snowi*, Edw.—I found this, somewhat sparingly, on Mts. Fairview and Piran, at Laggan, on July 19th and 20th, 1904, chiefly on the same ground as *A. Alberta*, from about 8,000 feet up, but occasionally on bare slides a little below the timber line. Mrs. Nicholl writes: "A high mountaineer, never seen below 7,000 feet. Widely

distributed over the high Rockies, but seldom plentiful." She reports finding it rather common far north of Laggan last summer. Some of my females have the centre row of black spots on primaries elongate as in the var. *fasciata* of *hypophlœas*.

Nearly all my blues are with Mr. Fordyce Grinnell, who is making a special study of the genus, and who, I hope, will soon straighten my species out. Meanwhile I am able to make these few additions to my former notes.

[60a. *Lycæna lygdamas*, Doubl.. var. *oro*, Scudd.—I cannot look upon the specimens I referred to under this head as being distinct from what I have listed as *Couperii*, which is very variable. Dr. Fletcher, in commenting upon Mrs. Nicholl's record of *Couperii* from Calgary and the Rockies, says : "The mountain form here referred to is called *lygdamas* by Canadian collectors, following Mr. W. H. Edwards."]

63. *L. shasta*, Edw.—I have not since seen the species from anywhere near Calgary, but have found it, somewhat sparingly, on either side of the Red Deer, north-east of Gleichen. It there frequents dry gravelly ground, preferably at the top of isolated knolls so common in the deep, water-worn coulees in that alkaline country, or close to the edge of banks, seeming to be fond of the flowers that grow in such situations. A few specimens were found in the coulee bottoms, June 20th to July 9th, though on the latter date most of my captures were much worn. I cannot distinguish the form from specimens received from South Park, Colo. The Red Deer locality is strictly prairie, and its occurrence there is rather peculiar.

65. *L. acmon*, Doub.-Hew.—I have taken it on the Red Deer, flying with *shasta*, but even less commonly. With Mr. Hudson I also took one or two in a dry pit about a mile from Gleichen station, July 5th to 9th, all in fine condition. Dr. Fletcher says : "It is the ordinary form of *acmon* not uncommon on the plains." Specimens in my collection from Colorado and California, which Dr. Fletcher tells me are the same species, have large spots, and most of them a wide red band beneath. It is not unlikely that the Banff specimen previously recorded may be *battoides*.

68. *Pieris sisymbri*, Bd.—Until recently I confused this species with a dark var. of *occidentalis*, and I find that my Pine Creek records were erroneous. I have, however, a pair of *sisymbri* from Laggan, received some years ago from Mr. Bean, the female being greenish-yellow, and dated "end of May." These, with a third specimen, female, from Glenwood Springs, Colo., form a basis for comparison. The Laggan male

alone has black veins on primaries above, a character possessed by none of my *occidentalis*. Quite the most obvious difference is in the marginal venular markings wherever present. In *sisymbri* these are of uniform width, not tending to widen out on the extreme margin. In *occidentalis* they widen out on the termen, usually joining above, occasionally beneath. Holland's description of the under side of the secondaries of *sisymbri* fits some of my *occidentalis* exactly, but though in an occasional specimen of *occidentalis*, the tendency there of the vein linings to broaden on the margin is very slight, their strongly dentate form on the primaries in all my specimens is unmistakable.

69. *P. protodice*, Bd.-Lec.—Except for an occasional female, I find I can now separate this from *occidentalis*. Generally speaking, the markings are all much heavier and darker in the latter, the marginal spots on primaries of *protodice* male being reduced to insignificance, and the secondaries beneath almost immaculate. There seems, too, a stronger tendency in *occidentalis* for the inner row of black blotches to form a band. In the females these differences are less pronounced, the black markings in both species being rather strongly developed, and, leaving the dark, strongly-marked form *(calyce?)* out of the question, the vein linings of the under side of the secondaries are occasionally very much alike. I have tried to find a constant feature in the inner submedian interspaceal spot on primaries. In *occidentalis* this is rather small, with a rather obvious tooth outwards. In *protodice* it is usually much larger and less obviously toothed. This, however, sometimes fails me in the females; in particular, a specimen from Chicago, where *occidentalis* surely cannot be found, as well as at least one of my Calgary specimens, looking equally well in either series. The outer margin of primaries in *occidentalis* seems nearly straight or slightly convex. In *protodice* it is usually slightly concave. This, however, is a variable feature. *Protodice* flies here in June and July, and a second brood emerges at the end of August. Like so many other species, it has been rather scarce here of recent years, and I am very poorly off for material.

72a. *Anthocharis creusa*, Doub.-Hew.—Mrs. Nicholl took a specimen at Banff on June 2nd, 1904, and I took one there myself on July 1st, 1907, quite fresh. I also took two or three in fine condition, and saw twice as many more at timber line on Mt. Piran, on July 17th last. The Calgary specimen previously recorded is probably the same species. In Rep. 36, Ent. Soc. Ont., 1905, p. 79, Dr. Fletcher says: "In *creusa* the black discal spot on primaries beneath is cut off square at the bottom, where it runs along the vein. In *ausonides* this spot tapers." In the two species, as I believe them to be, occurring here, this character is not constant either above or beneath. My specimens of *creusa* are considerably smaller than the average of *ausonides*, though larger than the smallest. The mountain specimens have rather more black basal shading above, but the Calgary specimen has scarcely more. But all have very much heavier reticulation beneath, with more green and less yellow, and are more thickly dotted above the costal margin of primaries on both sides. I have ventured to doubt whether Dr. Holland's fig. 23 on Plate XXXII is *creusa*. The reticulations show through, and look suspiciously thin, the costa is perfectly clean, and I have manifest *ausonides* with the discal spot just as squarely cut. Dr. Skinner, however, says that the figure is probably correct, and adds that *creusa* is so very close to *ausonides* that their exact relationship is not known. Mrs. Nicholl reported *creusa* to be not rare at Field during the first week in June of last year, and I took a fresh specimen near timber line on a mountain south-east of Windermere on July 13th. These appear to be the first records for B. C.

73. *Colias elis*, Streck.—Mrs. Nicholl writes concerning her 1904 trip: "*Elis* was scattered rather sparingly over all the high mountains of the main chain of the Rockies at an elevation of 6,500 to 7,500 feet. I took the greatest number on the slopes of a mountain above Hector Lake (= Wapta Lake, Hector, auct.): It also occurred at Lake Louise, Mt. Assiniboine and mountains above Simpson River." I think her Lake Louise record refers to a specimen she took on Mt. Piran, above Lake Agnes, on July 20th, when I was with her. It was probably its first appearance. Of her 1907 trip she writes: "Wilcox Pass, or rather the valley just south of it, is the headquarters of *C. elis*, which swarms there, with a few *christina* in company. It is evidently a northern insect, and is the commonest Colias on the Athabasca." She kindly sent me a few of the specimens, in fine condition, dated July 27th.

74. *C. eurytheme*, Bd., var. *eriphyle*, Edw.—Whilst admitting that I have made no special study of Colias, and have very little outside material in the *eurytheme* group, and moreover, that some forms of the genus are as variable and confusing as there are to be found in Euxoa amongst the noctuids, nevertheless, I find it hard to accept the two forms passing in the west as *eriphyle* and *eurytheme* as being of the same specific

identity. That the two are very closely allied there can be no doubt, occasional specimens being questionably separable even by colour. Yet the general impression conveyed by a series, as well as the regular occurrence of two broods of *eriphyle* in this district, as against the capture of *eurytheme* during one season only, clearly suggests two species. Mr. Bean, whilst at Laggan, perhaps made at least as close a study of the North American species of this genus as any man has yet done, and a few years ago I had a short correspondence with him upon this point. He wrote : " When I last studied the *eurytheme* problem the status seemed to be that in the north *eurytheme* breeds true and *eriphyle* breeds true. But the claim was made that in Colorado eggs of one form had sometimes developed the other. *I have often bred each form, and never had mixed results.* It was necessary to use great care in gathering the plants, to avoid smuggling in stray eggs, and there a doubt comes in as to the occasional mixed results." The above is significant. The italics are mine.

75a. [*C. occidentalis*, Scud.—The Lacombe specimens I referred to under this name are without much doubt the same as the " pale lemon-yellow form " I mentioned under *christina*. To me, however, they are separable from true *christina* solely by colour, the variations, in both the colour forms, of the discal spots and width and shape of border, being enormous, and in the females almost unlimited, though from personal observation of the two—one form being sometimes fairly common on days when the other is scarcely to be seen—I should strongly suspect two species. After my previous publication, Dr. Fletcher expressed a doubt to me whether a yellow *christina* ever existed. My reference was based on a letter received seven years previously from Mr. Bean, which I showed Dr. Fletcher, and from which I now quote. As I mentioned above, I accept Mr. Bean as being at the time one of the highest authorities on Colias, particularly as he bred several species on a somewhat extensive scale. He wrote from Laggan, discussing the opinion of a third person to whom he had showed his enormous local collection: "I had shown him a great series of *christina* bred and caught, ranging all the way from the ultra orange forms of Assiniboia to the local extreme of unmarked white females and yellow males with no orange at all. . . . . He admits himself puzzled by the very slightest one of all the difficulties *christina* presents, the colour variation, and that, although *the unity of the colour forms has been fully established.*" The italics are mine. I have a male and two females of the species known as *occidentalis*, from Wellington, B. C. They seem to differ from some of my specimens only in having rather more of the basal shading of black scales above, except that I happen to possess no Calgary females of that exact shade of colour, viz., greenish-yellow. A series of thirty Calgary females of the *occidentalis-christina* group are either orange, yellow or greenish-white, and scarcely any two even nearly alike in either colour or markings. Of much the same colour as the Wellington females are a few I took at Windermere, July 10th to 13th. These, with the males from the same place, are like my No. 75a in the very restricted area of the basal shading, but have a rather smaller discal spot on secondaries, which, in the males, shows through scarcely darker than the ground colours above. By these characters they are, without much doubt, identical with a species of which I have two pairs from Osoyoos, B. C., and a male from Pullman, Wash., which Mr. Elwes, Dr. Barnes and Dr. Fletcher all tell me are *emilia*. The male border is narrower than in most Calgary specimens of the group, in which, however, it varies much, even in orange *christina*, as does also the size and colour of discal spots in my 75a series. That this includes another species, *emilia*, is not impossible, but I do not know how to pick them out. Dr. Fletcher's likening the male to a large *interior* in his notes on Mrs. Nicholl's 1904 list, will not do, as in that species the band is not cut through by yellow veins, as seems usually the case with *emilia*.]

76. This species is *C. interior*, Scud., and agrees with specimens from Nepigon, Ont.

77. *C. nastes*, Bd.—Dr. Skinner, in telling me that *Streckeri*—erroneously listed by him in his Cat. Supp. 1 as a species—was described by Grumm Grohimailo from Laggan specimens as a var. of *nastes*, adds: "As far as I can tell there is little, if any, difference between the Alberta *nastes* and those found in Europe." I found the males just coming out on Mt. Piran on July 20th, 1904, on shaly *A. Alberta* ground. All I took that day were over 8,000 feet. Mrs. Nicholl reports it common at very high levels on every mountain she explored in the Rockies that year. She writes (under *nastes*): "It varies considerably, and I think that those from Mt. Assiniboine, the most southern point at which I found them, are paler and yellower than the more northern specimens."

78. *Parnassius smintheus*, Doub.-Hew.—My Laggan capture was a male, on what I have referred to as "Slate Mountain," three miles north-east (I wrote south-east in error) of Laggan station, on Aug. 8th, 1901, a

little below timber line. That from Banff was at about the same altitude on Sulphur Mt., on Aug. 12th. During 1904 Mrs. Nicholl met with males only at Simpson River, about twenty miles north of Mt. Assiniboine, on Aug. 13th and 14th, well above tree level. I have one of these specimens, which she refers to var. *Behrii*, and is very like Holland's figure of that form. My Laggan specimen is similar, that from Banff I sent away. She also sent me a few of a very similar form labelled "Wilcox Pass, July 27th, 1907." The type of var. *nanus*, Neum., is stated in Mr. Wright's book to have been taken near Calgary.

80. *Papilio nitra*, Edw.—Dr. Skinner says that a specimen I sent him is "quite unlike Holland's figure of the type," and is probably *Bairdii* or some slight var. of it, and that he has many like it from Colorado. In Holland's figure the yellow is a trifle darker in shade, and the black bar at end of cell on secondaries lighter, otherwise some of my short series scarcely differ. Holland's figures of *nitra* and *Bairdii* appear to differ, chiefly in the intensity and extent of the black basal shading, and form of anal eye spot. The Calgary species varies somewhat in these respects, approaching both. I have a crippled *Bairdii* ♂ bred by Mr. Edwards from Colorado eggs, and I must admit that its differences from Calgary specimens have never been clear to me. *Asterias* (from Ontario) also resembles the local form closely above in the male, but differs considerably beneath. I have not taken and but rarely seen a specimen for several years.

84. *Pamphila comma*, Linn., var. *Manitoba*, Scud.—I took a male, not quite fresh, near the summit of Mt. Piran, at about 8,500 feet, on July 20th, 1904. I am not sure to which name it is exactly referable.

87. *P. peckius*, Kirby.—Fairly common some years. Pine Creek, Billings's Mill, Gleichen, and Red Deer River. July.

89. *P. cernes*, Bd.-Lec.—Head of Pine Creek, June 25th to 28th.

90. *Pyrgus tessellata*, Scud., var. *occidentalis*, Skinner. The ordinary north-western prairie form has been described as *occidentalis* by Dr. Skinner in Ent. News, XVII, page 6, March, 1906, and figured on Pl. XIII, in the October number of that year, together with *tessellata* and *syrichtus*. On page 278 Dr. Skinner states that it is "not a species, but only a form or geographical race of *tessellata*. . . . . It is smaller and whiter in colour, and the spots are larger in proportion to the ground colour." He has specimens from N.-W. T. (Geddes), California, Arizona, and Texas. One of my specimens bears his label. Though far from common here in the hills, it is usually very common all over the prairies

round Gleichen, and from there to the Red Deer River north-east. It is either very playful or pugnacious, I am not sure which, and a great pest when one is after other small species. It darts up to another species on which the collector has his eye, goes through a kind of lightning three-card-trick performance for about a second, then darting as rapidly away, so distracts the eye as to confuse the beholder's power of distinction.

93. *Nisoniades persius*, Scud.—Dr. Dyar refers my form to *afranius*, Lint., but Dr. Skinner, confirming his previous identification as *persius*, says: "*Afranius* is at best only a local race of *persius*."

ADDITIONAL RHOPALOCERA.

570. *Melitæa acastus*, Edw.—Rather common locally on the Red Deer River bottom, north-east of Gleichen. In coulee bottoms. End June to middle July. I had this species for some years under the name *palla*, and have probably sent specimens out as such.

571. *Phyciodes nycteis*, Doubl.-Hew.—Recorded from Edmonton in Skinner's Catalogue. It was recorded thence by Geddes.

572.—*Grapta silenus*, Edw.—Mrs. Nicholl records the capture of two specimens at Banff, Aug. 30th, 1904. I have a specimen from Vancouver, received as such, and agreeing with Holland's figures, though darker, but have seen nothing like it from Alberta.

573. *G. progne*, Cram.—This seems to be less uncommon than the other Graptas occurring here, though I had not recognized it when I published my list. My dates are from Aug. 18th to May 29th, but like the rest of the genus here, it seems to go into hibernation early and come out late. I bred a specimen last fall from a full-grown larva found in a water tank, where I think it had dropped from a willow bush.

574. *Pyrameis caryæ*, Hbn.—Mr. Willing assures me that he has taken this species in Alberta. I am not aware that I ever saw it.

575. *Limenitis archippus*, Cram.—Two fine males by the side of the C. P. R. track at Gleichen station, on July 11th, 1904.

576. *Neominois Ridingsii*, Edw.—My first acquaintance with this species was with a pair presented to me by Mr. T. N. Willing, from Macleod, July 2nd and 8th, 1904. Mr. Arthur Hudson next came across it on a high dry knoll near the edge of the upper bench on the north side of the Red Deer, about 50 miles north-east of Gleichen, on July 5th, 1905. We subsequently found it, on that day and the next, in several similar situations, within a mile or two of the same spot. We took both sexes. It appeared to be very local, and by no means common. I also took a

few, mostly worn, whilst on a visit to the same locality on July 23rd of last year. I observed none south of the river. In habits and flight it is peculiarly like *Chionobas Alberta*, and, indeed, it is not altogether unlike that species in habitus.

577. *Satyrus sylvestris*, Edw., var. *charon*, Edw.—This seems peculiarly erratic in its distribution. I never met with it until 1904, when I took three males, quite fresh, on, and in coulees near, the Red Deer River flat north-east of Gleichen, on July 9th. I found it on both sides of the river, but saw no others. It was evidently just appearing. Mr. Hudson and I failed to find it there in early July of the following year, nor did I see any when there between July 23rd and 27th of last year. It occurs at Banff, as Mrs. Nicholl took it there in 1904, and I saw one in the museum labelled by Mr. Sanson, "Sun Dance Canyon, July 18th, 1906." Mrs. Nicholl tells me she found it just coming out on Kootenai Plains in mid-July of last year, and I found it, rather sparingly (as I did any other butterflies), at and below Windermere, on the Upper Columbia, B. C., from July 10th to 14th. It appears to be a mountain species, but as it occurs on the Red Deer, I cannot understand why, during 14 years' collecting, I should have had no records from within sixty miles of Calgary. Geddes records it from "Garnet Ranch" (Pincher Creek), and I have a specimen taken by a non-entomological friend at Mt. Head, in 1906. *Sylvestris*, by the way, is really the variety. Holland says: "The form with obsolescent ocelli has been named *sylvestris* by Edwards." Edwards, however, in Butt. N. Am., III, says: "It is *charon*, bandless on under hind wing; and this variation is not uncommon wherever the species is found." I have this variety from the Upper Columbia.

578. *Chionobas Brucei*, Edw.—Mr. Edwards in his Volume III says: "Mr. Bean reports finding *Brucei* at Laggan, Alberta." This is probably an error, as in part of the same work, published several months later, he quotes from Mr. Bean: " . . . On a mountain near Hector, B. C., two miles west of the Alberta Province line, . . . lives *Chionobas Brucei*, never yet observed at Laggan, only nine miles distant." Mrs. Nicholl kept a sharp lookout for it during her five or six weeks' collecting in those regions during 1904, but failed to come across it. But she found it in considerable numbers far to the north of Laggan during the latter half of July, 1907. She writes: "I have taken *Brucei* in plenty. It is evidently a more northern species than *Beanii*, and I think harder to catch. . . . The first place I took it was on a mountain at the head

of the North Forks of the Saskatchewan, flying with *Beanii*, and it was common on all the high mountains north of that." I am indebted to her for a dozen specimens, both sexes. These are all labelled, "Sheep Mountain, July 30th," and agree with *Brucei* from Colorado. Mr. Sanson took it on Sulphur Mountain, Banff, last year (J. Fletcher).

579. *Lycæa aquilo*, Bdv.—Rather common on Mt. Piran, from about 6,500 to 7,500 feet, on July 20th, 1904. Not having access to my collection of blues at present, I cannot be sure from memory that it does not occur below and above these limits. Mrs. Nicholl reports it common far north of Laggan last year. In 1904 she did not come across it between Banff and Mt. Assiniboine, but found it locally abundant near Lake O'Hara and Hector, B. C., and says: "It fairly swarmed on the damp patch at the head of Lake Louise" (July 21st). I bred a specimen on July 29th last from a larva found full-grown, on a rock in sunshine, far above timber, about 7,500 feet, on Mt. Stephen, Field, on July 7th.

580. *L. Scudderii*, Edw.—I am convinced that some of the forms referred to under this name in my notes on *melissa* are distinct from that species. I took a few females at Laggan, near the station, on July 18th, 1904, which were quite different from *melissa* females, and which I associated with males I had taken near Calgary, where it appears to be rare in places where I have collected. In the absence of my collection, I can make no comparisons.

581. *Pieris occidentalis*, Reak.—I take this species here as well as *protodice*. (Cf. my notes on that species). I have six west British Columbian specimens in my collection. Mrs. Nicholl says in her 1904 report: "Var. *calyce* is the high mountain form of *occidentalis*, and is much paler on the under side, and the veins yellow." A specimen sent me by Dr. Barnes as *calyce* is, however, the dark form. Holland does not mention *calyce*, so I am here in the dark. Moreover, the high mountain specimens I have taken are of the dark form. I saw four or five together on a high bare ridge of Mt. Field, about 7,500 feet, one of which I caught. I also took one at about the same altitude on Mt. Stephen, and several as high as the extreme summit of Piran. I doubt whether it breeds above tree level, and both light and dark forms occur at Calgary. All Calgary specimens bearing dates between April 21st and May 22nd are the dark form, and those from June 24th to Aug. 20th—two of these from Gleichen—are lighter, some very light and like *protodice*. The high mountain dark specimens are all July. There would seem to be two broods on the prairie, the early one the darkest. It is much less scarce than *protodice*.

582. *Colias pelidne*, Bd., var. *Skinneri*, Barnes.—This form should not be associated with *interior*, which I listed in error as *pelidne*. Mrs. Nicholl says that this is a very common butterfly over the whole of the higher Rockies in August, from about 5,000 to 6,500 feet. It may be taken right up to the timber line. She found it far north of Laggan in 1907. I took a specimen on Fairview on July 19th, 1904. I have a male from Yellowstone Park, one of the type localities. This sex resembles that of *Scudderi*, and it is compared with that species in the description. But in females of *Skinneri* the outer border somewhat resembles those of *interior*, whereas the female of *Scudderi* is nearer to that of *Alexandra*.

583. *Pyrgus centaureæ*, Ramb.—I took two worn specimens on Mt. Piran on July 20th, 1904, one at Agnes Lake, the other about 1,000 feet above it and above the timber, = 7,500 feet. One of these has been labelled "*centaureæ* undoubtedly" by Dr. Skinner. Mrs. Nicholl, during the whole of her 1904 trip, only took one specimen, "very high up, above Lake Louise." In 1907 she took one on Brobokton Pass in August, which was possibly a second brood. She says: "I have two that Simpson got me early in May." Mr. Jim Simpson was her guide and packer. I took a splendid specimen below timber line on a mountain about eight miles south-east of Windermere, B. C., on July 13th last, flying with worn *cæspitalis*. It is not on the B. C. list, though recorded from that Province in Holland's book.

(To be continued.)

DESCRIPTIONS OF SOME NEW MICROLEPIDOPTERA FROM PENNSYLVANIA.

BY AUGUST BUSCK, U. S. NATIONAL MUSEUM, WASHINGTON, D. C.

Gnorimoschema alaricella, n. sp.—Labial palpi whitish, sprinkled with blackish scales, especially externally; terminal joint with a black spot at the base and a broad black annulation just before the tip. Face, head and thorax white, heavily sprinkled with fuscous. Fore wings with the bluish-white ground colour nearly obscured by darker scaling of black, dark fuscous and brown, which suffuses the wing without definite pattern, though with the effect of diffused longitudinal streaks. On the middle of the wing is a very indistinct brown ocellate spot, with black centre, and on the fold below it is another similar but still less distinct spot; both of these are easily effaced and lost in the general dark scaling. Cilia gray. Hind wings dark fuscous, with ochreous-tinted cilia. Abdomen with basal joints velvety-yellow above; tip and under side dark fuscous. Legs dirty-yellow, dark mottled exteriorly; tarsi blackish, with narrow indistinct ochreous annulations. Alar expanse, 18–19 mm.

Habitat.—Oak Station, Alleghany Co., Pa. (F. Marloff.)

Type.—U. S. N. M., No. 11557.

A fine large species, typical of the genus, intermediate between *tetradymiella* and *Banksiella.*

Gelechia fluvialella, n. sp.—Labial palpi dirty-ochreous, speckled with dark brown exteriorly; brush moderate, rounded, hardly divided. Face iridescent-brown. Antennæ dark purplish-brown. Head and thorax light brown. Fore wings light brown, with a strong purplish sheen, especially towards apex; exterior edge of the cell and the apical veins roughly indicated by ill-defined, purplish-black longitudinal lines, more or less confluent towards apex. Cilia ochreous, dotted with brown. Hind wings light fuscous. Abdomen dark purplish-fuscous. Legs blackish, with narrow ochreous annulations on tarsal joints. Alar expanse, 18–20 mm.

Habitat.—Oak Station, Alleghany Co., Pa. (F. Marloff.)

Type.—U. S. N. M., No. 11558.

A plain-looking species nearest *ochreostrigella* and *ochreosuffusella*, but differing from the former by the dark brown thorax, from the latter by the unmottled basal half of the fore wings and the less defined striation.

Borkhausenia ascriptella, n. sp.—Labial palpi light ochreous. Face shining straw-coloured. Antennæ straw-coloured; in male with long (3–4) ciliation and slightly serrated towards the tip; basal joint with strong pecten. Head and thorax straw-coloured. Fore wings shining straw-coloured, sparsely sprinkled with single black scales and with black markings as follows: extreme base of costal edge black; an ill-defined short black longitudinal streak on the middle of the cell; a larger round black dot at the end of the cell and a small black spot on the fold. Cilia whitish-yellow. Hind wings light fuscous, cilia ochreous. Abdomen and legs ochreous; front legs black on anterior side. Alar expanse, 10.5–11.5 mm.

Habitat.—Plummer's Island, Potomac River, Md. (Busck.) Oak Station, Pa. (F. Marloff.) Pittsburg, Pa. (H. Engel.)

Type.—U. S. N. M., No. 11559.

The species has the colour of and a certain general resemblance to *Tinea pellionella.*

The antennal pectination in the males is rather longer than normally found in this genus, but the species is undoubtedly rightly placed near *pseudospretella*, Stainton.

Epermenia albapunctella, n. sp.—Labial palpi blackish-fuscous; inner side of second joint ochreous. Face, head and thorax blackish-fuscous. Antennæ dark fuscous; basal joint with strong pecten. Fore wings dark fuscous, mottled with lighter fuscous, black and brown scales. An ill-defined, broad, blackish fascia across the middle of the wing is preceded and followed by lighter patches. On the end of the cell is a round white dot, preceded and followed by a black longitudinal dash. Apical cilia blackish, tornal cilia gray. Before the middle of the dorsal edge is a large black scale tooth, followed by a smaller one beyond the middle, and this by two still smaller. Hind wings dark fuscous; cilia gray. Abdomen and legs fuscous; tarsi black, with ochreous annulations. Alar expanse, 13 mm.

Habitat.—Oak Station, Alleghany Co., Pa. (F. Marloff).

Type.—U. S. N. M., No. 11560.

One of the small dark species of this genus, but at once distinguished from all described species by the conspicuous pure-white dot at the end of the cell.

Batrachedra placendiella, n. sp.—Labial palpi blackish-fuscous; terminal joint with an ochreous annulation at base and with the extreme tip ochreous. Face light iridescent-fuscous. Head and thorax dark fuscous. Antennæ dark purplish-fuscous, with narrow black annulations. Fore wings blackish-fuscous, slightly sprinkled with white scales; a black longitudinal streak on the fold at the middle of the wing, with a smaller, nearly effaced, black spot obliquely above it on the disc, and a black longitudinal streak within the edge above tornus. Cilia light fuscous. Hind wings dark fuscous, with lighter cilia. Abdomen dark purplish-fuscous, with extreme anal tip ochreous; in the female with short protruding horny ovipositor, clothed with long erect hairs. Alar expanse, 11 mm.

Habitat.—Oak Station, Alleghany Co., Pa. (F. Marloff).

Type.—U. S. N. M., No. 11561.

This is exceedingly close to *Batrachedra salicipomonella*, Clemens, of which I have bred specimens from willow galls, Washington, D. C. It corresponds in general colour and markings, though without the longitudinal white streak, mentioned by Clemens, which, however, is not always very pronounced in his species. But the present species is a more robust insect with broader wings. Venation typical, with 6 and 7 separate in the fore wings, 5 and 8 absent. Hind wings with all veins present.

Batrachedra trichella, n. sp.—Labial palpi light ochreous, with a small black spot on extreme side of second joint. Face very light straw-coloured, iridescent. Head and thorax light ochreous. Antennæ smoky-ochreous. Fore wings at base light ochreous, this colour gradually deepening toward apex, where it has a purplish-brown tinge. Basal third of costal edge thinly black ; at apical fourth is a short longitudinal black streak on the middle of the wing, and at the base of the apical cilia is a short tranverse black streak. The wing is sparsely sprinkled with scattered black scales. Cilia light ochreous. Hind wings light ochreous. Abdomen fuscous. Legs ochreous. Alar expanse, 15–16 mm.

Habitat.—Oak Station, Alleghany Co., Pa. (F. Marloff).

Type.—U. S. N. M., No. 11562.

A large slender species nearest the European *Batrachedra pinicolella*, Duponchel.

Venation typical, with 6 and 7 in fore wings stalked, 5 and 8 absent ; hind wings with all veins present.

Elachista orestella, n. sp.—Oral parts, face, head and thorax pure white. Antennæ smoky on outer half. Fore wings white, with a slight yellowish tinge ; on the fold equidistant from the base and the apex of the wing lies a small oblong deep black spot, and obliquely above it is a similar black spot at the end of the cell. Cilia and hind wings white. Abdomen whitish-fuscous. Legs smoky-white. Alar expanse, 11 mm.

Habitat.—Oak Station, Alleghany Co., Pa. (F. Marloff).

Type.—U. S. N. M., No. 11563.

A very striking and easily-recognized species. Venation typical ; fore wings with 11 veins, vein 4 absent, 6 and 8 out of 7. Hind wings with 7 veins, 6 and 7 stalked, 5 absent.

ERRATUM.

On page 161, sixth line from the bottom, the following words were inadvertently omitted by the transcriber after *Phyton pallidum*, Say : "And two specimens of *Cregya oculata*, Say."

ONE OF OUR NEGLECTED "GREENS" (GEOMETRIDÆ).

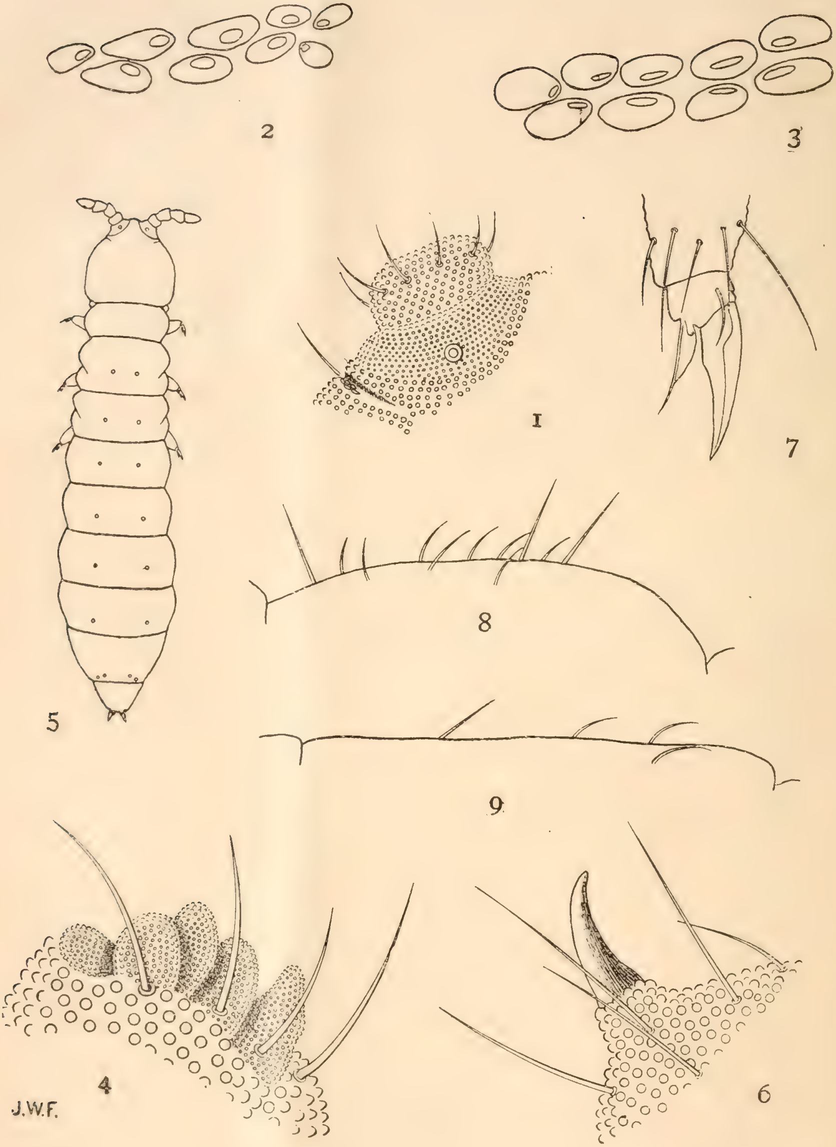
BY RICHARD F. PEARSALL, BROOKLYN, N. Y.

This little moth I find generally associated, when present in collections, with *phyllinaria*, Zell., which in reality is rather a rare species. For a long time I have been aware of its distinctness, but I could obtain no clean, fresh specimens of the latter for comparison. Packard's description (*Zelleraria* = *phyllinaria*), in Mono. Geo. Moths, p. 370, is an excellent one, and, as he points out, the front is *green* and the colour more solid, without irrorations, and the cross lines finer and firmer than in many species. The following description should make the differences specific :

Chlorochlamys vertaria, n. sp.—Expanse, 14–15 mm. Palpi deep ochre, tipped with red. Front brownish-red. Antennæ and along costa ochreous. Thorax and all wings above pale sea-green, the latter finely irrorate with whitish. Cross lines yellowish-white, distinct. On fore wings basal line crosses in two rather strong outward curves, one from costa to median vein, thence another to inner margin. Extra discal starting from costa, two-thirds out, nearly straight at origin, rounds somewhat outwardly to vein 5, where it makes another outward curve to vein 1, and thence outward in a short straight line to inner margin, well within anal angle. Sometimes this line makes a single broad outward sweep to vein 1. No discal dots above or below. Fringes rather long, green at base, white terminally. Hind wings without basal line. The extradiscal, an extension from fore wings, runs subparallel with margin, but as in fore wings, with two outward curves and outward straight line to inner margin, the short curve opposite cell being sharper and well marked. Beneath greenish-white, the extradiscal white lines above faintly showing through ; costa rather broadly ochreous. Abdomen above and beneath, and legs, white, a little tinged with ochreous, the fore tibiæ washed with brownish-red.

Type.—♂ from Phœnix, Ariz. (ix, 18, '07), and ♀, Phœnix, Ariz. (ix, 16, '07), through Dr. R. E. Kunze, in my collection.

Co-types.—Three males.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THE GOLDEN SNOW-FLEA.

THE GOLDEN SNOW-FLEA, *APHORURA COCKLEI*, N. SP.

BY JUSTUS W. FOLSOM, URBANA, ILL.

(Plate 5.)

In British Columbia there is a minute yellow Collembolan that appears in crowds so dense as to cover the snow with a carpet of gold.

This species was discovered by Mr. J. W. Cockle, of Kaslo, B. C., whose specimens and data sent to Doctor Fletcher were by him referred to the writer.

The literature on Collembola contains many references to snow-fleas, and one author, Dr. R. Latzel, has made a convenient summary of all that has been written on the subject (Carinthia, II, Nos. 5 and 6, Mitt. Naturh. Landesm. Kärnten, 1907).

In the United States only "black" snow-fleas have figured in the literature, and the species that has done most to deserve the name of snow-flea is *Achorutes nivicola*, Fitch (see Psyche, Vol. 9, p. 315), a dark blue species that swarms on the snow every year, in Massachusetts and New York, and doubtless elsewhere. It is not often reported, however, since it becomes active at a season when most of the collectors are still dormant.

When most of the insects also are hibernating, Collembola are active—even before *Boreus* appears, and before the winter species of Perlidæ, Culicidæ, Chironomidæ, Bibionidæ and Muscidæ are on the wing. Collembola revive at a temperature that is too low to arouse other insects; in the Arctic region they flourish when other insects fail.

During his experience of many years in the mountains, Mr. Cockle saw this golden snow-flea for the first time in 1906, and again in 1908; and his inquiries among men who spend most of their time among the snows have not enlightened him as to the occurrence of the species in other localities. He has not found it on his summer trips among the glaciers; in fact, he has found it only at Kaslo, on a steep bank one hundred feet above the river, at an altitude of 2,250 feet, and surmises that it came from the river. None of the Collembola are known to be aquatic in their development, however, though some of them frequent the surface of water, and most of them require a moist atmosphere; and the snow-fleas develop in the soil or under loose bark or moss. This genus *Aphorura* is essentially, but not altogether, terrestrial; but the black snow-fleas of the genus *Achorutes* develop under bark, as a rule, where they can be found in the dead of winter, long before they appear on the snow.

Mr. Cockle is as yet alone in his enjoyment of the spectacle presented by the golden snow-flea. He writes enthusiastically about these lively creatures that illumine the snow over patches of several square yards. As the snow melts, the snow-fleas are carried off in the currents of water and deposited on the surfaces of the pools, where they accumulate in immense numbers. They cannot sink in water, on account of their clothing of bristles, and even in strong alcohol they are not easily immersed without being shaken in the fluid, unless the fluid is hot.

The golden snow-flea loses its colour when it dies out of doors in the pools, and becomes dirty white ; but when the insect is preserved in alcohol or Canada balsam, the pigment is singularly permanent ; the specimens that Cockle sent out two years ago are now as vividly yellow as ever.

Strictly speaking, the colour is not golden-yellow, but lemon-yellow—even though the former would be preferable on account of its associations.

Aphorura Cocklei, n. sp., is lemon-yellow and slender. Head with one pseudocellus behind the base of each antenna (Plate 5, Fig. 1). Postantennal organ of eight to ten papillæ, which vary in form within the limits of oval, ovate and elliptical (Figs. 2, 3). Antennæ three-fourths as long as the head. Antennal organs five-lobed (Fig. 4), the lobes being stout, rounded, and suboval, subovate or subconical. The number of dorsal pseudocelli to each body segment is successively (Fig. 5) 0, 2, 2, 2, 2, 2, 2, 4, 0. Anal spines two (Fig. 6), stout, curved, subequal in length to one of the ungues, and seated on separated, or nonconfluent, papillæ. There is no trace of a furcula. Claws similar throughout, the first pair being slightly larger than the rest ; unguis (Fig. 7) stout, feebly curved, untoothed ; unguiculus two-thirds as long as unguis, with semi-elliptical basal lamella and acuminately prolonged apex ; tenent hair single, simple, and as long as the unguis. Clothing of minute curved setæ and fewer but longer stiff setæ. Maximum length, 1.8 mm.

Tullberg's description of *Aphorura sibirica* (Collembola borealia, 1876, p. 40) applies, so far as it goes, to this snow-flea, but applies equally well to a second species ; for the description is broad enough to include at least two distinct species. The other of these is a form which Dr. Karl Absolon found in the caves of Moravia ; and because it fell under Tullberg's description of *sibirica*, he retained that name for the cave form, and at the same time gave a good description of the species (Zool. Anz., Bd., 23, 1900, p. 408). This description of *Aphorura sibirica*, Tullberg-Absolon, fits our golden snow-flea, which has, however, certain characters that Absolon did not mention.

Upon finding that Cockle's species agreed in every respect with Absolon's description, I sent specimens and drawings to Absolon, in order to determine whether the two species were the same. He informed me that they were not; that his species was always white, and not so slender as the yellow one; and he sent me eight specimens of his cave species, from which to draw my own conclusions.

I agree with him that the two species are distinct. They are sharply separated by striking differences in colour and form, and by less striking but not less constant differences in the antennal organs and the clothing. In *sibirica*, Tullberg-Absolon, the lobes that constitute the antennal organ are slender and finger-like—quite unlike those of *Cocklei*. In *sibirica*, T.-A., the minute curved setæ of the body are few; in *Cocklei* they are numerous, and interspersed with longer and stiffer setæ; and the arrangement of the setæ is conspicuously different in the two species, as is indicated in Figures 8 and 9.

Since the golden snow-flea refuses to take the name of *sibirica*, we must give it a new name; and it is appropriate, as Dr. Fletcher suggests, to name this energetic entomological inhabitant of British Columbia after Mr. J. W. Cockle.

Four hundred and ninety-nine types, Kaslo, B. C., Jan. 31 and March, 1906; Feb. 23, 1908; J. W. Cockle. Many of the types have been sent to the U. S. National Museum, Washington, D. C., and to the Museum of Comparative Zoölogy, Cambridge, Mass. Others will be sent to specialists in this order of insects.

PLATE 5.

Fig. 1. *A. Cocklei.*—Base of left antenna, × 200.
“ 2. “ “ Postantennal organ of right side, × 1234.
“ 3. “ “ “ “ “ “ “
“ 4. “ “ Right antennal organ, × 823.
“ 5. “ “ Dorsal pseudocelli, × 43.
“ 6. “ “ Right anal spine, × 400.
“ 7. “ “ Left foot of first pair, × 400.
Fig. 8. *A. Cocklei.*—Setæ near median dorsal line of metathorax, × 300.
Fig. 9. *A. sibirica.*—Setæ near median dorsal line of metathorax, × 300.

BROWN-TAIL MOTHS AT GARDINER, MAINE.

It is gratifying to learn that but few Brown-tail Moths' nests are to be found in this vicinity this spring, as compared with the number found last year at this time. In the worst infested orchards last year where 100 nests were taken, not more than 4 or 5 are to be found this year. While they were very thoroughly picked last year, it is hardly to be expected that that is the entire cause for the decrease this year. Most of the nests examined last year did not seem to be in a healthy condition—the larvæ were very stupified and many were dead, but I am sorry to say that all that I have opened this spring are very lively and apparently ready for business. As this is not far from the northern boundary of the Brown-tail Moth area, it is interesting to note that we have had one year of a decided decrease in their numbers.

Two years ago not more than 20 nests were found in Gardiner, last year about 2,000 were gathered in, and this year 200 would, perhaps, be a fair estimate.—A. T. REYNOLDS, Gardiner, Maine.

TWO NEW SPECIES OF ASILIDÆ FROM BRITISH COLUMBIA.

BY JAMES S. HINE, COLUMBUS, OHIO.

The two species of Robber Flies here described as new were collected by Messrs. R. V. Harvey and R. S. Sherman, who reside in Vancouver, and who have sent in many other interesting species of Diptera. In one of his annual publications Dr. Fletcher has adopted the plan of reporting interesting captures of insects from the various sections of Canada, and it is notable how many of those reported in 1905 and 1906 were taken in British Columbia. The insect fauna of the Province soon will be fairly well known if the dozen or more resident collectors maintain their present interest in the matter. Success to their efforts.

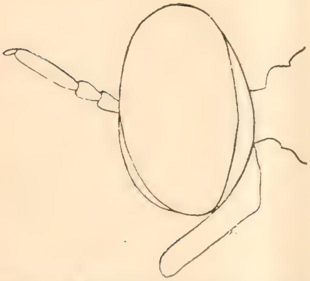

FIG. 7.—Side view of the head and antenna of Cophura albosetosa.

Cophura albosetosa, n. sp. — Black, thorax covered with gray dust, abdomen shining blue-black, with white spots on the sides of the segments, wings brownish-hyaline, body and legs clothed with white bristles and hairs. Length, 7 to 9 mm.

Face slightly, but evenly convex and rather wide, front clothed with silvery dust and white hairs, which are longest and coarsest, and sometimes brownish near the oral margin. Ocellar tubercle rather prominent ; posterior orbits thickly clothed with rather fine white hairs. Antenna black, first two segments with white bristles ; third segment of uniform width, with a short style bearing a small bristle at the tip ; length much in excess of the first two segments together. Thorax clothed with gray dust and furnished with white hairs, which on the disk may have a brownish tinge ; scutellum clothed with gray dust and white hair ; legs black, with white bristles and hairs, hind tibiæ and tarsi somewhat enlarged and with short golden pile on part of the anterior surface ; wings uniformly very dilute-brownish, so dilute, in fact, that they might well be said to be hyaline.

Male abdomen shining blue-black, of nearly uniform width throughout its length. Each segment, from one to six on either side, with a distinct white spot on the posterior margin.

Female abdomen shining blue-black, widest near the middle of its length, each segment, from one to five on either side, with a white marking on the posterior margin. These markings are larger and longer than in the other sex.

Two males and a female from Hope Mountains, B. C., July 19, 1906, and a female from Similkameen, B. C., July 20, 1906.

There seems to be some uncertainty as to the limits of the genus Cophura as used by the different authors, and it is therefore with a certain hesitation that I have concluded to place the present species in it, but from the standpoint of the récent catalogue by Aldrich, who follows Williston, *albosetosa* may be included. It has affinities with some of the species placed in the genus Taracticus, but the abdomen shows no sign of punctulation. It is probable that when a critical study of sufficient material is possible the limits of Cophura will be restricted. Although the insect has a general resemblance to some of the species of Cyrtopogon, it does not belong there because of the claw-like spine at the end of each front tibia.

NIGRASILUS, n. genus.

Front and face of ordinary width, face widest below. Facial gibbosity rather prominent and with numerous bristles. Third segment of the antenna rather narrow, and a little longer than the first two together, arista only about half as long as its segment. Thorax with bristles on the posterior part and several bristles on the margin of the scutellum. Wing venation as in Asilus in the restricted sense. Posterior margins of the abdominal segments without bristles that differ in length from those on other parts of the abdomen. Female genitalia plainly conical; male appendages plainly bent upward near the middle of the length.

Nigrasilus nitidifacies, n. sp.—Black, wings slightly fumose, face just beneath the antennæ shining black; female with conical oviduct. Length, 12 to 15 mm.

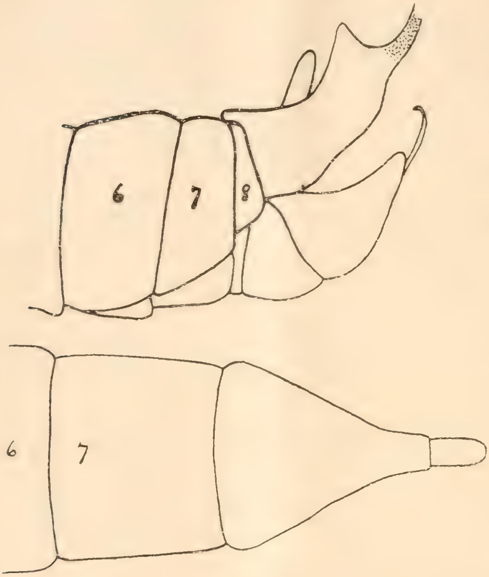

Fig. 8.—Nigrasilus nitidifacies.—Side view of the tip of the male abdomen (upper diagram). Dorsal view of the tip of the female abdomen (lower diagram).

Facial gibbosity rather prominent, and clothed with black bristles above and white bristles below; face just beneath the antennæ shining black, otherwise clothed with gray dust, which is most pronounced along the entire margins of the eyes; beard white; occipito-orbital bristles all black. Ground colour of the thorax black, but thinly covered with gray dust, four to six black bristles on the margin of the scutellum; wings slightly fumose, almost hyaline on basal parts. Femora all black, with fine white hair and black bristles; tibiæ and tarsi more or less dark red, approaching black in parts. Hind tibiæ each with three or four black bristles on the front side near the middle. Abdomen black above, with gray hind borders to the segments.

A male specimen collected in the Hope Mountains of British Columbia by R. S. Sherman, July 16, 1906, and a female, collected on Vancouver Island, July 2, 1903, by R. V. Harvey.

This insect has the general appearance of the species of some of the other genera of the subfamily Asilinæ, but if Loew's classification is to be followed and his subgenera raised to the rank of genera, as is the tendency, it must stand in a new genus, mainly on account of the black colour and the very peculiar genitalia of both sexes.

NEW SPECIES OF THERIDIIDÆ.

BY NATHAN BANKS, EAST FALLS CHURCH, VA.

Theridium pictulum, n. sp.—Cephalothorax brown on sides, pale in middle, but the pale contains a large goblet-shaped dark mark. Abdomen black on base, with a median projection, followed by a narrow whitish-mottled folium, margined with black, the black of base extends on sides downward to the venter, enclosing a white spot on each anterior side. Sides of abdomen white, more or less mottled with brown, spinnerets surrounded with black, venter blackish, with a prominent median sub-triangular snow-white mark, sternum brown. Legs white, with many black bands; femora i and ii with a narrow mark below before middle, a broader one above at middle, a sub-apical ring, and a narrow apical mark; patella with sub-apical mark; tibia with basal, median, sub-apical and apical marks, none complete rings; metatarsus with basal, median and apical bands; tarsus with median band. Legs iii and iv less marked, the femora with sub-apical ring and apical mark; patella with apical mark; tibia with median and apical bands; metatarsus with basal, median and apical bands; tarsus with median band. Tibia i barely shorter than the metatarsus i. Length, ♀, 3 mm.

From Palo Alto, Calif. (Coolidge).

Theridium interruptum, n. sp.—Cephalothorax with a dark margin on the side, rest yellowish-brown; abdomen grayish, with silvery-white spots and black marks as follows: a narrow stripe each side on anterior part, on posterior part a much broader stripe each side, with obliquely-pointed bases, and extending down on sides of abdomen behind; the sides at base and near middle are also black; venter pale, with a broad black band across middle, but not reaching the sides; sternum pale, narrowly margined with black. Femora, patellæ and tibiæ of legs i and iv blackened at tip, other legs less distinctly so. Abdomen rather elongate, not much wider than cephalothorax, and somewhat flattened, truncate at base, rounded at tip, region of epigynum swollen. (Fig. 9.)

Length, 1.3 mm.; leg i, 2.4 mm.

Miami, Florida, Feb. 16, under boards on the ground (Prof. J. H. Comstock).

EURYOPIS : Table of Species.

1. Posterior dorsum of abdomen mostly silvery-white................3.
Entire dorsum mostly black, only a few small silvery spots, no bands on legs..2.
2. With four or five silvery spots ; legs with black line under femora..*5-maculata.*
With six or ten silvery spots ; legs without black line ......*argentata.*
3. Tibia and metatarsus brownish, and without bands ; abdomen silvery, with narrow median black stripe........................*formosa.*
Tibia and metatarsus yellowish, banded with black................4.
4. Cephalothorax and sternum yellowish..........................6.
Cephalothorax and sternum dark brown..........................5.
5. Dorsal silvery mark extends around base ; marks on legs fine and much broken up.....................................*scriptipes.*
Dorsal silvery mark not around base ; marks on legs in form of distinct rings..*funebris.*
6. Legs heavily marked with fine black lines ; venter silvery. *Californica.*
Legs only slightly marked with black; venter brownish...... *Texana.*

Euryopis argentata, Emer.—This species occurs in the Atlantic Coast States.

Euryopis 5-maculata, Banks.—I have seen this only from the vicinity of Washington, D. C.

Euryopis scriptipes, n. sp.—Cephalothorax a uniform brown, eyes on black spots ; abdomen black, with a silvery-white mark around on upper sides, barely or just meeting on base in front, very broad behind, and enclosing a black heart-shaped dorsal mark ; sometimes the white is broader and the black is smaller and indented on its sides ; venter black in middle, sides silvery, sternum black, coxæ tipped with black, the spinnerets surrounded with black ; legs yellowish, densely marked with small transverse black marks, those at apex of joints heavier and forming rings, the tarsi barely, if at all, marked, the femora but little marked above; the tarsus of male palpus black, in the female the other joints marked with black. Eyes and other structure as in *E. funebris*, and size the same.

Specimens from Colorado (Oslar) ; Pecos and Beulah, New Mexico (Cockerell).

Euryopis Californica, Banks.—This species I have seen only from California.

Euryopis funebris, Hentz.--This species is widely distributed in the Eastern States, and also in Canada.

Euryopis Texana, n. sp.—Cephalothorax yellowish or yellowish-brown, eyes on black; abdomen mostly silvery-white, with a brown-triangular mark on middle of anterior part, narrowly bordered on sides and behind with black; venter brownish, sternum yellowish, legs yellowish, slightly marked with black at tips of joints and a few scattered dots elsewhere, mostly at bases of bristles; mandibles and palpi pale yellowish. Rather smaller than *E. funebris*.

Brazos Co., Texas.

Euryopis formosa, n. sp.—Cephalothorax uniform yellowish-brown; abdomen silvery-white, with a narrow median black stripe, constricted near middle and pointed at tip; venter brown in middle, a silvery lunule behind, black around the spinnerets and extending forward each side as a narrow line on the sides; sternum yellowish-brown; femora yellowish, beneath with bands of brown; apex brown; patellæ, tibiæ and metatarsi wholly reddish-brown; tarsi paler; femur of palpus yellowish, rest red-brown. Size and structure similar to *E. funebris*.

From Bear, Idaho (L. M. Cockerell).

Argyrodes rostratus, n. sp.—Cephalothorax brown, or yellowish-brown; eye region black; legs pale yellow; the patellæ and tips of the tibiæ yellowish-brown; sternum brown; abdomen bright silvery above, brown beneath, with a small silvery spot each side; a narrow median black stripe on dorsum from base two-thirds of way to tip; extreme tip with small brown spot. A. M. E. large, more than diameter apart; P. M. E. smaller, more than two diameters apart. Femur i nearly as long as abdomen. Abdomen triangular in side view, prolonged above behind, the tip bluntly rounded, as high behind as long. In the male the abdomen is more rounded at tip above; the eye region is elevated into a prominent hump, bearing the P. M. E. above and the A. M. E. in front, while on the clypeus there is a porrect, rather knob-like projection. (Fig. 9.)

Length, ♀, 2.2 mm.; ♂, 2 mm.; femur 1, 1.5 mm.

From Runnymede and Miami, Florida (the latter from Prof. Comstock).

Argyrodes frontatus, n. sp.—Cephalothorax yellowish, a median blackish mark behind eyes and on the sides; legs pale, tips of joints blackish; sternum pale; abdomen grayish or silvery, densely marked with blackish spots, mostly on the sides; above is a narrow median black stripe from base two-thirds of the way to tip; venter pale. A. M. E. large, about diameter apart; P. M. E. smaller, more than two diameters apart. Femur i as long as abdomen, the latter conically extended above behind, in side view it is triangular, the tip is rather broad and very plainly emarginate. Abdomen of male less extended above, but also emarginate at tip. The head of male has two short median processes; one on clypeus extending upward, and one above M. E., both bearing stiff hairs at tips. (Fig. 9.)

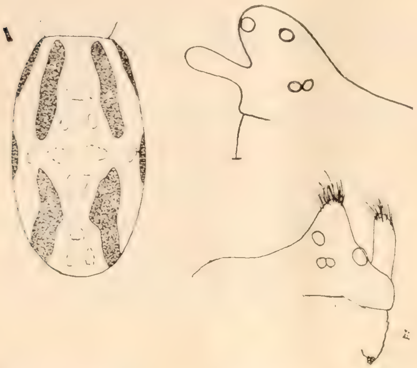

FIG. 9.—Theridium interruptum: dorsum of abdomen (on left); Argyrodes rostratus: head of male (upper right hand); Argyrodes frontatus: head of male (lower right hand).

Length, ♀, 3.1 mm.; ♂, 2.7 mm.; femur i, ♀, 2.4 mm.

From Ocean Springs, Miss., Jan. (Prof. Comstock.)

Argyrodes decorus, n. sp.—Cephalothorax dark brown; palpi mostly black; legs yellowish, marked with dark brown on black; femora i brown, leaving only a pale streak each side at base; patella brown, except above; tibia brown on apical third, shading off into pale; tip of metatarsus dark; leg ii similar, but with less dark; leg iii mostly pale, only dark at tips of joints; iv mostly pale, but dark on outside of femur. Abdomen with a broad black stripe above, from base to tip, with a cross-bar somewhat before the tip; venter black, the black extending up each side above spinnerets; the abdomen behind, parts of the sides and above are silvery, or with some golden colour. Cephalothorax quite flat, head but little elevated; A. M. E. large, about one and a half diameter apart, and as far from the smaller S. E.; P. M. E. scarcely two diameters apart; femur i longer than abdomen, the latter greatly prolonged above behind, so that the posterior side is twice as long as the venter; tip rounded.

Length of ♀, 3.2 mm.; height of abdomen, 3.3 mm.; length of femur i, 2.9 mm.

From San Pedro, California.

A NOTE ON THE SPECIES OF *MICRONECTA* OCCURRING IN INDIA AND CEYLON (HEMIPTERA).

BY G. W. KIRKALDY, HONOLULU, H. ISLANDS.

In the "Fauna of British India" (Vol. III, 50–51, 1906), Mr. Distant has redescribed two species only of this genus from India and Ceylon, thus omitting six previously described, three of them being old and well established.

Eleven species are now known to me from these countries, one being now diagnosed and three left to a future time.

1. *albifrons*, Motsch., =|| *striata*, Fieber, = —*ovivora*, Westw., = *siva*, Kirk.
2. *grisea*, Fieber.
3. *haliploides*, Horvath.
4. *malabarica*, Kirk.
5. *memonides*, Kirk.
6. *M–notata*, Kirk., =|| *lineata*, Fieber, = *notata*, Kirk., 1905 (by misprint).
7. *punctata*, Fieber.
8. *thelxinoë*, Kirk.

Micronecta malabarica, sp. nov.—The general characters are those of *M. albifrons*, but the tegminal picturation is very faint; there is no trace of a transverse line on the distinctly longer pronotum, and the interior margin of the vertex is also in a direct line with that of the eyes. Length, 4 mill.

Hab.—India, Malabar Coast.

P. S.—When my list of the known species of *Micronecta* was published (Ent. News, 1905, p. 261), I had not heard of five species published the same year, viz.:

1. *quadristrigata*, Breddin, from Java.
2. *ludibunda*, " " Java.
3. *fugitans*, " " Java and Celebes.
4. *pardalina*, " " Java.
5. *inflatula*, " " Java.

I also omitted *hydroporina* (Sigara), Von der Decken, 1873, from East Africa.

I have now in the press descriptions of two new forms, *pallida* and *micra*, from Australia, so that the total number of species is now 47, of which perhaps 42 or 43 are valid. It is safe to predict that ultimately some hundred species or so will be known.

CONCERNING THE NOTONECTIDÆ AND SOME RECENT WRITERS ON HEMIPTEROLOGY.

BY J. R. DE LA TORRE BUENO, NEW YORK.

These notes are called forth specifically by a paper in "La Feuille des Jeunes Naturalistes" (Rennes)[1] by A. Delcourt, entitled "De la Nécessité d'une Revision des Notonèctes de France," but they lead naturally to some considerations on recent work.

M. Delcourt claims that a revision of French Notonectids is necessary, and not being familiar with his region, we will not dispute it, but when he develops his argument it becomes necessary to differ from him. He falls at once into the error which has lead astray more than one Hemipterist, namely : that colour alone is a sufficient character for the differentiation of species in water-bugs, when in all recent work[2] it is more often than not neglected. My own careful studies of the common and abundant North American *Notonecta undulata*, Say, have made this plain to me, because here we have an insect covering a great range, and which is apt to differ greatly in series from one and the same pond, varying from a pure white to nearly black. *But they are one and the same species.* These colour variations in *N. glauca* appear to trouble M. Delcourt very much. This, no doubt, is due to his unfamiliarity with any work later than Dr. Puton's very meritorious "Synopsis des Hémipteres Hétéroptères de France." It is naturally not to be expected that a French author should be posted on what is done on this side of the water. But why ignore Kirkaldy's "Revision of the Notonectidæ"?[3] In this the entire question of the synonymy of *Notonecta glauca* is gone into, and he indicates the different varieties into which the species may be differentiated, all this after a careful examination of the types, so this work may be considered nearly definite. And, further, the same author published recently "*Uber Notonectiden*,"[4] in which wherever corrections in his previous work were necessary he made them, thereby bringing to date his earlier "Revision." Had the French reviser been familiar with these two articles he would not have deemed it necessary to propose the work he contemplates, even going to the extent of promising a revision of Palæarctic forms !

As for the remainder of M. Belcourt's paper, once he departs from the speculative and arrives at the concrete, it is not entirely valueless.

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1. No. 442, Aug. 1, 1907, pp. 198-207.
2. Cf. Montandon, Kirkaldy, Horvath, etc.
3. Trans. Ent. Soc. Lond., 1894.
4. Wien. Ent. Zeit.

He gives directions for collecting and preserving as well as for breeding, and although he gives few details, he appears to have succeeded in breeding *N. glauca*, but does not describe the nymphal stages. He claims that they have *six* moults, one on emerging from the ovum, which I have observed in *N. undulata*. But I deem this first moult merely the casting off of the amnion, and not a true moult of an outgrown skin. The French author has solved the food problem by giving the nymphs young mosquito larvæ, which I also have found suitable. The remainder of his paper covers nothing not heretofore known and pointed out in detail in this country.

Now, as to the second count. Certain Hemipterists appear to consider a proper understanding and use of synonymy a purely unnecessary luxury. Therefore we find in much work that decidedly erroneous names are employed, both generic and specific. Furthermore, old errors are cheerfully adopted and popularized, and no question is ever made as to the work of certain authors, who are very Mohammeds of Hemipterology, and whose dictum is final. To-day Hemipterology is as much neglected as it was fifty years ago. There are perhaps some half-dozen workers who keep it alive ; but outside of these the others who take interest in this branch of the science are apparently willing to let some one else do the work.

As to the philosophical side of the science, since Schjodte, who has attempted to place the classification of the Order on a firm foundation of phylogeny? Reuter, Bergroth, Stal, but principally the former. To-day, Kirkaldy is working in this direction, and he is proposing changes of so radical a nature that before they are accepted a complete readjustment of our ideas becomes imperative. And even then such new conceptions of relationships may obtain that his scheme may be rendered obsolete. But to-day a system of classification which lumps together such diverse forms as the *Nepidæ*, with the other so called Cryptocerata, is decidedly in need of reform along more scientific lines.

BOOK NOTICE.

OS CULICIDEOS DO BRAZIL, PELO DR. ANTONIO GONCALVES PERYASSU. Trabalho do Instituto de Manguinhos, Rio de Janeiro. Typographia Leuzinger, 1908.

This interesting work on the mosquitoes of Brazil contains over 400 pages, with 26 plates. It is written wholly in Portuguese, which will make it especially valuable for local use. The book is the result of two years of assiduous labour, as Dr. Peryassú tells us, at the Instituto de Manguinhos in Rio de Janeiro, Brazil, under the direction of Dr. Oswaldo Cruz and Dr. Arthur Neiva. It is a creditable production. Dr. Peryassú records about 130 species of mosquitoes from Brazil (in one place he gives 131 species, in another 127), but there must be many more to be found in this large region. Mr. Busck found 90 species in the Panama Canal Zone during a short stay of but three months. The author's observations on larvæ are especially interesting, though we wish more details had been given of the Culicine forms. The Anophelines are most favoured, no doubt from their pathological connections, and receive more detailed study. The eggs of *Chagasia farjardoi*, an Anopheline, are most curious objects, resembling floating dipterous pupæ, one end modified like a respiratory organ.

Our author has adopted the classification of Lutz, as modified by Theobald. Our objections to this classification need not be here repeated, as they have been set forth elsewhere, and the classification has many points of excellence, although it needs simplification. That Dr. Lutz's classification should be used in a publication emanating from Brazil is, of course, entirely fitting. Some of the records of species, more especially those cited from other authors, will require critical revision. We notice, for example, *Dendromyia Smithii*, Coquillett, credited to Rio de Janeiro on the authority of Farjado, which is to say the least a doubtful record.

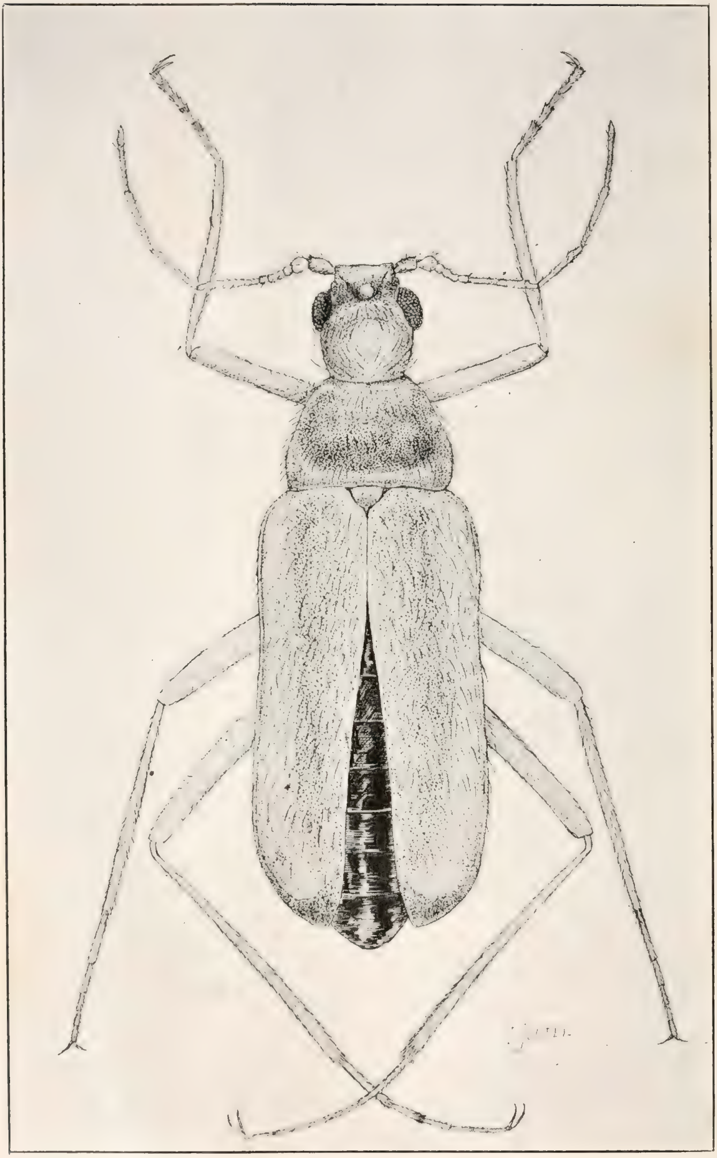
Our author has entirely omitted all references to the places of publication of species and genera. We had hoped to learn the exact dates and references to Dr. Lutz's and Dr. Cruz's species, published in Brazilian medical journals not available in Washington, but were disappointed.

A number of new species are described, mostly credited to other authors, Dr. Peryassú having reserved for himself but one species so far as we notice. Unfortunately Dr. Peryassú's generous intentions will fail, for there is no evidence that any of the descriptions were written by another than the author himself, and, as we understand the rules, new names are to be credited to the one first publishing them, not to one who had suggested the name or labelled a specimen therewith. Therefore all the new species in the book must be attributed to Dr. Peryassú.

HARRISON G. DYAR.

Mailed June 5th, 1908.

PLATE 6.



IGNOTUS AENIGMATICUS—ADULT MALE.

The Canadian Entomologist.

Vol. XL. LONDON, JULY, 1908. No. 7.

A BIT OF CONTEMPORARY HISTORY.

BY ANNIE TRUMBULL SLOSSON, NEW YORK.

In the Canadian Entomologist, Vol. XXXV, p. 183, in a paper entitled "A Coleopterous Conundrum," I told of my discovery of an anomalous beetle occurring as a seeming museum pest in my New York collections. In this article I quoted freely the expressed opinions of several well-known coleopterists as to the position and affinities of the singular little insect. My paper, though it contained nothing which was not strictly true, was, unfortunately, written in a somewhat flippant, would-be humourous style, its colloquial diction and tone of levity—if not absolute irreverence—being quite out of place in a scientific periodical. This, as I should have known from sad experience, was a grave error. No conscientious naturalist should possess, or recognize in others the possession of, a sense of humour. As might have been anticipated, painful results followed my blunder. In writing the sketch referred to, I had not dreamed of making a scientific description of the odd coleopter, or of giving a generic or specific name. But I carelessly introduced the following sentence: "Shall I ever find other specimens of what I have sometimes, in chat over my discovery, styled Ignotus ænigmaticus?" I wrote the absurd name with a smile, which I somehow fancied would be caught and interpreted aright, even by far-away readers of my humble paper. Eheu! Alas! Alack! How little I realized what I was doing. I was not long in ignorance. For I very soon learned that, all unwittingly, I had, at least in the opinion of some of our most distinguished and learned entomologists, created a genus and species, and I had given to them names which, however ridiculous and inappropriate, must henceforth and forever cling to these dainty little creatures, these curios among coleoptera and perhaps be linked, too, with my own unworthy name. My protests, my plea that I "didn't go to do it," were all in vain. The innocent beetle was referred to constantly by the unfortunate title used so idly, so lightly at first ; its counterfeit presentment appeared each month for a whole year on the cover of an entomological journal thus labelled, and I began to realize, as never before, the irrevocableness of things. I sought advice, and received much and diverse counsel. But the consensus of opinion seemed to be that, as the beetle was now so well known by the name I had unconsciously given, it had best retain it, and that a proper description with figures should be at once published.

I asked my friend, Mr. Frederick Blanchard, to prepare such a description, and he kindly consented to do this. But he courteously insisted upon my name remaining as authority for the specific, if not the generic, title. My first discovery was made in May, 1902. For two years after this I examined my insect boxes at intervals, but found no trace of the little pests. But in May, 1904, I again found them in the same closet where they occurred previously. This time I found with them one specimen of the larviform female and several larvæ. Mr. Joutel, our well-known, careful and skilled artist, made drawings of the beetle in its different stages. Mr. Blanchard for many reasons has been unable until recently to complete the promised diagnosis. I give herewith a description of the species, owning frankly that I could not have written it without much assistance from Mr. Blanchard. Let me add that since I first found Ignotus it has been recognized as a pest among the collections of the Public Museum of Milwaukee, as told me by Mr. C. T. Brues. In this case the beetle was found among land shells and other specimens "practically from all parts of the world." Of what country the mysterious unknown is a native we do not know. Perhaps the following description and Mr. Joutel's excellent drawings may assist us to solve the problem. Then, when we learn what euphonious name the unknown enigma bears in some far-away land, and its lately-given title vanishes into that bourne from which no synonym returns, nobody will regret less than its unfortunate sponsor to see it

"Suffer a sea change
Into something rich and strange."

THE CHARACTERS OF IGNOTUS (PLATES 6 AND 7).

Head suborbicular, constricted far behind the eyes, deflexed and much narrowed in front, the labrum short, transverse, and with the very small mouth a little reflexed, the frontal suture not obvious. The oral organs are minute and apparently somewhat atrophied, especially in the female, but they have not been so successfully examined as to be clearly understood. The mandibles are minute and rudimentary, and too widely separated to have any function. In the male the maxillary palpi are very small and slender, with a short basal joint, the second longer than wide, the third narrow, not longer than wide, fourth equal to the third in length, subulate. Mentum short and narrow, transverse, arcuate in front, ligula narrower, twice as long as the mentum, palpi apparently of two subequal joints, together not longer than the terminal one of the maxillary palpi. These organs are smaller in the female and still more difficult to verify. The gular sutures are obscure, but sometimes obsoletely indicated in the female when they are approximate in front and diverging behind. The eyes are large, prominent and rather coarsely granulated in the male, quite small in the female, and of few facets somewhat irregularly disposed. An ocellus, smaller in the female, is present between the eyes, within the apex of two converging grooves which arise at the bases of the rather prominent antennal supports. The antennæ are ten-jointed, basal moderate, second shorter, three to six very small and closely articulated, seven to ten very elongate ; in the female the antennæ, although of similarly proportioned joints, are very much smaller and shorter.

The pronotum is somewhat trapezoidal, broader in the female, the sides not margined, but inflexed to the subobsolete prosternal sutures, the pubescence of the inflexed portion similar to that of the upper surface, and contrasting with the very sparsely pubescent prosternum. The prosternum is convex and moderately long before the coxæ, not at all separating them in the male, the coxal cavities confluent, and in both sexes broadly open behind. In the female the prosternum is a little shorter before the coxæ, broadly produced and truncate behind between the widely-separated coxæ, its entire length about one-half that of the pronotum.

Mesosternum of the male transverse, slightly sinuate in front, lobed behind and loosely articulated with the metasternum, between the coxæ, sides oblique, the lateral pieces small triangular and subequal, the epimera alone reaching the coxæ.

Metasternum of the male transverse, a little longer than the second and third segments of the abdomen ; episterna broad anteriorly, gradually narrowed behind ; epimera not observed.

In the female these two segments are more rudimentary or larva-like, the mesosternum being simply transverse without intercoxal development, the coxæ at extreme lateral margin, parapleura obscure. The metasternum is shorter and broader than in the male, in dried specimens with the inflexed hind margin emarginate between the widely separated coxæ, the episterna moderately wide and scarcely narrower behind.

Scutellum small, triangular in the male; in the female the mesonotum is short and distinctly narrower than the other segments; the metanotum again longer, although shorter than the pronotum, and somewhat wider than the mesonotum.

Elytra of male without epipleura.

Coxæ conical and prominent, loosely articulated and mobile, the anterior pair contiguous in the male, the middle and hind pair well separated, the latter a little more widely. In the female, while the body is broader, the coxæ are much smaller, and reaching the same lateral limits become more widely separated.

Middle and hind legs in the male two-thirds as long as the body, the anterior ones shorter; trochanters slender, longer than wide, the femora attached distally; tibiæ a little longer than the femora and without spurs; tarsi slender, a little shorter than the tibiæ, five-jointed, first joint as long as the next two, second, third and fourth gradually shorter, fifth elongate, with small simple claws. In the female the legs are very small and weak, not longer than the width of the body.

Abdomen with seven free subequal dorsal and ventral segments in the male and eight in the female.

The eggs are elliptical, twice as long as wide, translucent, shining, slightly iridescent and minutely longitudinally striate. Length, 5 mm.

The larva is somewhat contractile, elliptical, twice as long as wide, obtusely rounded at each extremity, abdomen a little wider, the dorsal segments corneous, shining, brown, densely fringed with spinose bristles and fine hairs; beneath with soft membraneous integuments, and finely sparsely hairy.

Head small, less than half the width of the prothoracic segment, reddish-brown, rather thickly clothed with short coarse hairs, prostrate in front, sparser on the vertex, and more erect behind, and with a few spinose bristles. Epistoma very short and transverse, the separation from the front rather deeply impressed, labrum short and transverse ; mandibles short, blunt, piceous ; antennæ minute, a basal very short joint scarcely as long as wide supporting a second of the same thickness, twice as long as wide ; in the final moult, apparently of one or two very short joints bearing a terminal short tuft or pencil of fine closely-placed hairs. Behind and a little outside the antennæ are three ocelli in a triangle. (Fig. 10.)

The pronotum is longer than any of the following segments, the anterior outline somewhat semicircular, without any anterior angles, meeting the broadly arcuate basal margin in an indefined obtusely rounded angle. The following thoracic and abdominal segments subequal, short and strongly transverse, the ninth shorter and narrower. The vestiture is composed of hairs and bristles of three kinds ; the hairs are simple, long and fine, the bristles are taper-pointed or clavate, and sometimes abruptly acuminate, and throughout thickly hispid with minute black points or spines. (Figs. 10, 11.)

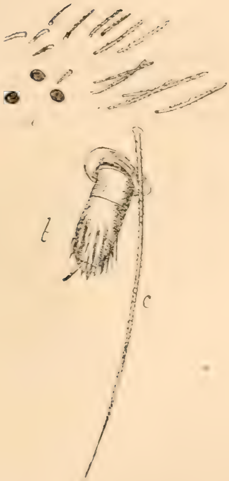


FIG. 10.—Ignotus ænigmaticus, larva : *a*, ocelli ; *b*, antenna ; *c*, a long hair.

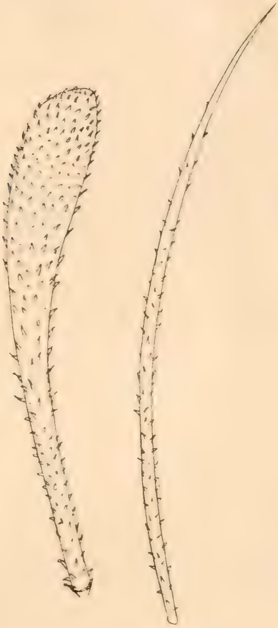


FIG. 11.—Larval hairs.

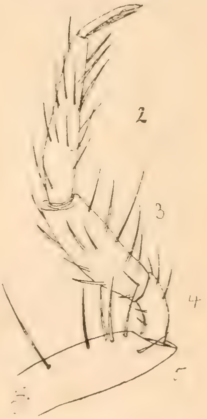


FIG. 12.—Middle leg of male larva.

The median dorsal surface of the segments, from side to side, is sparsely, finely pubescent with simple hairs, the anterior margin and a posterior interval glabrous. The anterior margin of the pronotum extending forward, and the posterior margins of the eighth and ninth dorsals of the abdomen extending backward, are densely fringed with tapering bristles; the posterior margins of the thoracic and abdominal dorsals, except the last two, are similarly fringed with subdepressed clavate bristles of equal length, of which seventy to eighty have been counted on a segment; behind and mostly hidden under the clavate bristles is a series of fine simple hairs bordering the hind margins of the segments. The anterior fringe of the pronotum affords protection to the junction of the head, while the fringes of clavate bristles and subordinate hairs effectively defend the membranous connection of the segments from dust or minor enemies. At the narrowed lateral extremities of the second and third thoracic and the first to second abdominal dorsal plates are spreading tufts of tapering bristles.

The spiracles are exceedingly minute and difficult of observation, the thoracic pair, as usual, before and outside the middle coxæ, the abdominal at the sides, below and slightly anterior to the lateral extremities of the dorsal plates.

Coxæ, femora and tibiæ subequal in length, the coxæ narrowing from base, the femora a little thicker outwardly, the tibiæ slender and tapering to apex and terminated with a slender claw, which, as well as the trochanter, is about one-third as long as the other joints of the leg.

The pupation of the female only has been observed. This takes place within the larval skin just as in *Anthrenus*. A middorsal rupture of the skin frees the imago, leaving the delicate pellicle of the pupal envelope within the larval moult.

Both sexes of *Ignotus* are apterous, and the female is without elytra. The male has long slender antennæ and legs, which are very much shorter and weaker in the female. The surface is sparsely obsoletely punctate. In the male the first two dorsal segments of the abdomen are paler and membranous, the following semicorneous or coriaceous and piceous; ventral sutures straight, first ventral membranous and more or less concealed at the middle, visible and of firmer texture at the sides; second segment with a lobe-like pubescent tumidity at middle of hind margin; sixth segment slightly sinuate behind, seventh subtruncate or broadly rounded. In the female the first three dorsals are shorter, scarcely longer than the mesonotum, the fourth to eighth longer and subequal, the ventrals subequal, the first two more membranous, the eighth narrower and rounded behind.

Much attention has been given to the relations of *Ignotus* with other Coleoptera, and it is hoped later to offer some of the considerations bearing on the subject. The structure and habits of the larva make it almost impossible to resist the conviction that it is Dermestide, but the loose-jointed imago with its long slender legs and antennæ in the male seem very far from the compact Dermestide type, the only immediately obvious character suggesting affinity consisting in the presence of an ocellus. This is so rare among Coleoptera as to be very suggestive.

Ignotus ænigmaticus, n. sp.

Male.—Elongate, a little wider behind, testaceous, the head, prothorax, metasternum and sometimes the tips of the elytra somewhat darker; abdomen more or less piceous; thinly clothed with pale prostrate hairs, somewhat condensed on the basal two joints of the antennæ, whole surface coriaceous and feebly shining. Head narrowed arcuately behind, and slightly constricted at its insertion with the prothorax, the latter wider than long, much narrowed anteriorly, sides arcuate to base, where they are minutely inflexed, with blunt right angles, the anterior ones rounded, truncate before and behind; sides of the pronotum narrowly inflexed, with a faintly indicated demarcation between them and the flanks; upper surface feebly convex, more or less impressed each side, base indistinctly margined. Elytra shorter than abdomen by one or two segments separately rounded at tips and somewhat dehiscent. Length, 2–3 mm.

Female.—Wingless, larviform. Elongate, narrowed towards each extremity, testaceous, thinly dotted with paler hairs, which are a little longer and more bristling along the middle of the sides; surface somewhat coriaceous, feebly shining. The prothorax more transverse than in the male, and more evenly convex, with no trace of basal margin. Abdomen with subequal segments, the last one broadly rounded behind dorsally and ventrally. Length, 2.7 mm.

PAMPHILA MANITOBOIDES, FLETCHER, AND PAMPHILA, SASSACUS, SCUDDER.

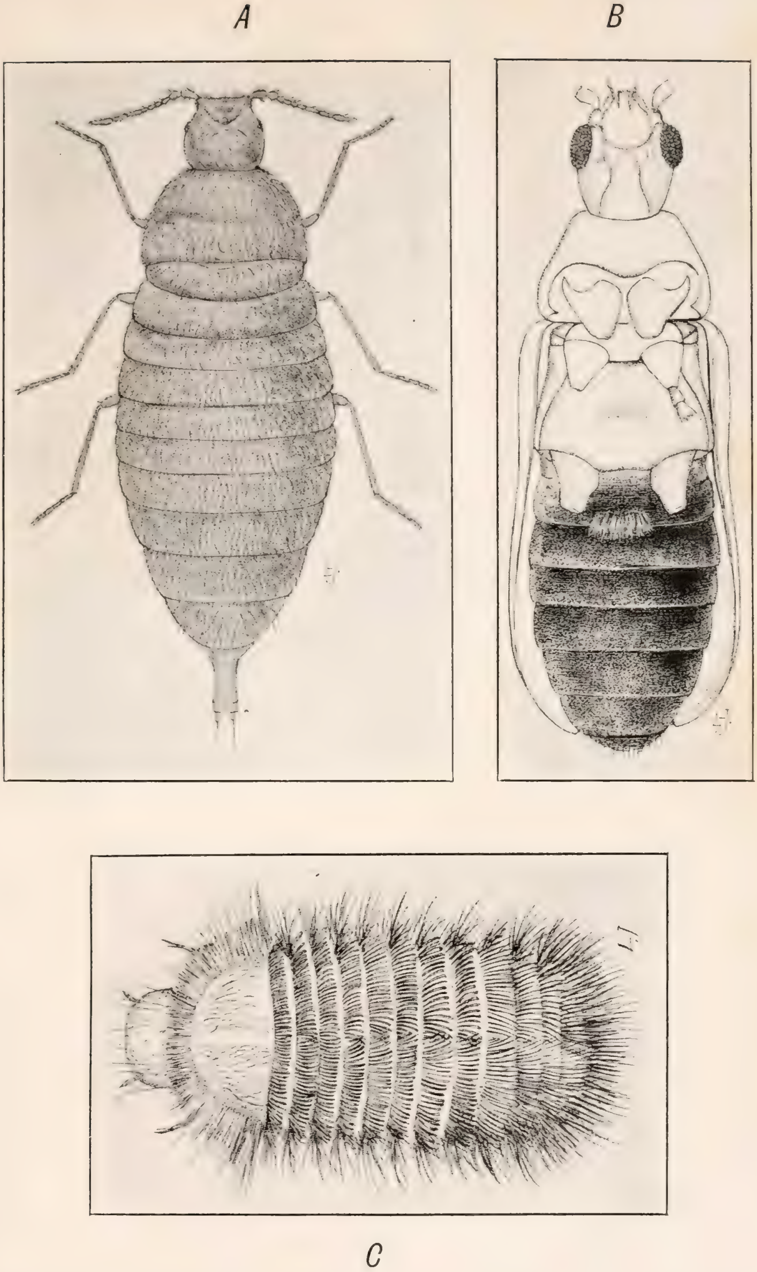
BY HENRY SKINNER, PHILADELPHIA.

Since our visit to Nepigon last July, Dr. Fletcher and I have been greatly interested in these two insects. The amount of material in *Manitoboides* has been limited until this recent trip. Last year we captured a few specimens at Nepigon, and Dr. Fletcher has sent me four males and six females. I had in addition five males and eight females. I have compared these specimens with a series of *sassacus* from Pennsylvania, New Jersey, New York and New Hampshire, and have arrived at the conclusion that *Manitoboides* is a geographical race, topomorph or subspecies of *sassacus*. There is a very great difference between the two when extremes are selected, but the intergrades show their relationship. In the male *(Manitoboides)* the limbate area of secondaries above is greatly restricted as compared with *sassacus*. The under side of secondaries in *sassacus* is immaculate in some specimens, and the contrast between these and the heavily-spotted under side of *Manitoboides* is very striking. The differences mentioned are gradational through a series. The stigma, antennæ, etc., are identical. The Nepigon specimens show considerable variation among themselves. According to evolution these are the things we expect to find. If future studies and study of the life-histories prove my conclusions erroneous, I at least think it well to call attention to their very near relationship at this time.

It is gratifying to learn that both Houses of the United States Congress have concurred by a unanimous vote in granting an annuity for life of $1,500 each to the widows of the late Major James Carroll, Surgeon in the U. S. Army, and the late acting Assistant Surgeon, Jesse W. Lasear, whose lives were sacrificed to duty in the study of the transmission of yellow fever in Cuba by the mosquito *Stegomyia fasciata*

A SYNOPSIS OF THE GENUS PEMPHIGUS, with notes on their economic importance, life-history and geographical distribution, by C. F. Jackson, Ohio State University.

This very important and extremely useful paper has just been received. The author deals with the characterization, history of the formation, general anatomy, habits, life-history and derivation of the genus, and gives a key to the genera of the family Aphididæ, with an appended key to the species of the genus Pemphigus and a synopsis of the species, with notes on their economic importance.—[T. D. JARVIS.



IGNOTUS AENIGMATICUS.—A, ADULT FEMALE; B, UNDER SIDE OF MALE (HAIRS OMITTED); C, LARVA.

NOTES ON THE SPECIES OF RHYNCHAGROTIS, SM., WITH DESCRIPTIONS OF NEW SPECIES.

BY JOHN B. SMITH, SC.D., NEW BRUNSWICK, N. J.

The genus *Rhynchagrotis*, Smith, is restricted by Hampson to the yellow-winged species allied to *gilvipennis*, Grt., the latter being declared generic type because it happened to stand first in the series, even though it contradicted the generic description in part and was placed in the genus with an expressed doubt as to the correctness of the association. A more absurd consequence of rigid adherence to an arbitrary rule can scarcely be conceived, and I decline to accept this limitation of my genus. The bulk of the American species which I placed in *Rhynchagrotis*, Hampson places in *Triphæna*, Hbn., and if that is correct, then my genus is a synonym—a conclusion to which I could take no possible exception. I do not believe, however, that the yellow winged *Triphæna* of Europe are congeneric with the American species that I have called *Rhynchagrotis*, and therefore retain the name in the sense in which I originally used it. If *gilvipennis* is generically distinct it should have a new generic name. For present convenience, however, I retain the species here, again emphasizing the fact that it differs obviously not only in colour, but in minor structures from the rest of our species.

The present rearrangement of my material was induced partly because my boxes were becoming overcrowded, partly because I had received a large number of specimens in some groups showing great range of variation, partly because I had material which could not be satisfactorily referred, and partly because I wished to bring my collection into accord with Sir George F. Hampson's general conclusions.

I secured by purchase, from Mr. George Franck, a large lot of Colorado material; Mr. Otto Buchholz, of Newark, who collected in Yavapai County, Arizona, in 1907, was good enongh to loan me all his examples—some 200 or more, and Mr. J. W. Cockle, of Kaslo, B. C., sent me a nice lot, representing the species found in his locality. Other material was obtained in smaller amounts from other correspondents, so that I believe myself justified in the conclusions reached in this revision.

The basis of separation after eliminating the yellow-winged *gilvipennis* is, first of all, the dark brown head and collar which distinguish *rufipectus* and *brunneicollis*.

Next comes *minimalis*, which is unique in having single median lines where all the others have them geminate.

Bimarginalis and *vittifrons* stand together by having the costal region of primaries from base to the t. p. line pale, discoloured; an even streak which does not invade the cell or the ordinary spots.

Next comes a longer series of species, in which the orbicular is open to the costa and is more or less distinctly V shaped. The costal region may or may not be paler than the ground colour, and there may or may not be a black filling in the cell around the spots; the open orbicular distinguishes *formalis*, *costata*, *confusa*, *crenulata*, *exsertistigma*, *lætula*, *discoidalis*, *niger*, *emarginata* and *meta*. In addition to the character of maculation all these species have the thoracic crest distinctly marked, and furrowed or divided centrally.

This latter feature is also shared by *mirabilis*, which has contrasting discoloured ordinary spots, and *inelegans*, which has not much maculation of any kind.

All the rest of the species are more depressed or flattened, without obvious thoracic tufting, and the orbicular is always completely defined, never open to the costa.

Placida differs from all of those in this series by having an obvious median shade line.

Scopeops and *variata* have a bluish underlay, which appears throughout the wing and gives them a characteristic mottled appearance.

Then comes a series of species with somewhat elongate, subparallel wings, with rounded or stumpy outer margins. They are all variable, and it is difficult to divide them on exclusive characters. I include *nefascia*, *duanca*, *alternata*, *alcandola*, *Belfragei*, *anchocelioides*, *brunneipennis* and *cupidissima*.

Last of all come *trigona* and *sambo*, two species with shorter, broader, triangular wings, in which the apices are well marked and the outer margins are oblique.

Rhynchagrotis gilvipennis, Grt.

Our only species representing the yellow-winged forms of the old world. It occurs throughout the Northern United States and Canada, extending west to Calgary and into British Columbia, but not reaching the Pacific Coast. It extends northward to Anticosti and into Labrador and probably throughout the boreal region. It is a close ally of the European and Asiatic *chardynii*, Bdv., and was at one time supposed to be the same. There is not much variation in the numerous specimens I have seen.

Rhynchagrotis rufipectus, Morr.

This species extends across the continent through the more northern parts of the country, but does not seem to extend southward in the Atlantic Coast region nor in the Mississippi Valley. It does, however, extend southward on the Pacific Coast, and is recorded from Los Angeles Co., in Southern California. In general the species is easily recognized, and does not vary much in any one region. There is, however, a very decided difference between the small dark gray specimens of the New England States and the large reddish-gray examples that I have from Sierra Nevada. With examples of the extremes only at hand, two species would be readily accepted. Fortunately, in the series of examples from Kaslo, both forms were found, taken apparently on the same dates. The gradation comes in the form of a reddish powdering over the dark lustrous gray of the typical form. As this intensifies, the gray seems to disappear, until only the reddish overlay remains, conveying the impression of a more thinly-scaled wing.

Rufipectus and *brunneicollis* are distinguished from all our other species in having the head and collar velvety-brown.

Rhynchagrotis brunneicollis, Grt.

Has about the same general distribution in the Eastern United States as the preceding, but seems to extend further southward along the Atlantic Coast, and does not extend westward through Canada into British Columbia, nor have I seen it from the Pacific Coast at any time. It is larger than *rufipectus*, reddish and brown instead of gray, and the transverse lines are geminate instead of single.

Rhynchagrotis minimalis, Grt.

This species is rarely represented in collections, and specimens so named are, as a rule, incorrectly determined. It differs from practically all of the subsequent species by the single, instead of geminate median lines, and in that character is not unlike *rufipectus*, which it does not resemble in any other way. I have seen it only from Maine, Colorado and British Columbia, and always in isolated specimens. In colour it resembles *anchocelioides*, and it may be mistaken for a disreputable form of that species.

Rhynchagrotis bimarginalis, Grt.

Not in my collection and apparently very rare. Has been taken only in New Mexico, and is easily recognizable by the pale yellow costa and more bluish terminal space; it is quite characteristic, and its only ally is the next species.

Rhynchagrotis vittifrons, Grt.

All my specimens are from Stockton, Utah, September and October, or Fort Wingate, New Mexico, in September. The species is lustrous smoky-blackish, without obvious maculation, but with collar and costal margin from base to t. p. line broadly pale yellow. It differs from the preceding in that the terminal space is concolorous with the main body of the wing. The species is also recorded from Glenwood Springs, Colo.

Rhynchagrotis formalis, Grt.

This is an extremely interesting form from the Pacific Coast, extending from Southern California to Vancouver, and it needs a long series to appreciate its variations. In ground colour it ranges from red to deep chocolate-brown, more or less powdered or washed with bluish, the costal area paler and with the bluish more conspicuous, invading the open V-shaped orbicular. The transverse maculation is largely lost and the terminal area is usually bluish, or at least a little paler. In the normal form there is a black streak at base below the median vein, and the cell before and between the ordinary spots is black. This is the *facula* of Grote, according to Hampson, and it varies in the direction of losing the black filling of the cell. In the type of *formalis* the black basal streak is lost, and this varies in the direction of losing the black filling in the cell, and finally the black tip to the collar. This seems to make it a difficult species to recognize, and so it is from limited material; but these uniform examples are in the minority, and, in almost every instance, there is a darkening of the ground that locates the usual black markings. All the examples before me, 15 in number, are from California, and illustrate the extreme range of variation above given.

Rhynchagrotis costata, Grt.

This is not represented in the material before me. I have a coloured figure made from the type many years ago, and that is very like Hampson's published figure. The species is pale red-brown in colour, the costa broadly paler, not crossed by the median lines, orbicular broadly V-shaped. The t. a. line is obscure, and the basal streak seems to merge gradually into the black filling of cell.

Rhynchagrotis confusa, Sm.

Resembles *costata* in a general way, but the transverse lines are much better marked and, at base, the black streak usually curves downward when it reaches the t. a. line, so as to form its inner defining element.

In the material before me is a nice series of 8 ♂'s and 7 ♀'s from Mr. J. W. Cockle, taken at Kaslo, B. C., July to September, and they indicate a very pretty range of variation, similar in scope to that in *formalis*. The collar may or may not be black-tipped, a distinctly black tip being rare, and the black filling of cell and basal streak may be totally absent. In the latter case there is usually an intensification of the red-brown that brings out the pattern almost as well as the black.

Other localities represented in the material are Pullman, Washington; Corfield, Vancouver; Stockton, Utah; Monterey, California.

Rhynchagrotis crenulata, Sm.

This is a darker, more purplish-brown species, in which the costal region is not contrastingly paler, and is crossed or marked by the median lines. The collar is not noticeably black-tipped, but is inferiorly paler, or is crossed by a pale transverse line, which may be black-edged. All the examples before me are from Pullman, Washington; Stockton, Utah, or Placer Co., California, and those that are dated are in July.

Rhynchagrotis exsertistigma, Morr.

A dull luteous-brown, sordid looking species with black-tipped collar. The costa is of the palest wing colour, but not contrasting, and the pale costal coloration does not fill the orbicular. That spot is V-shaped and open to the costa; but while its defining line is pale, the core of the spot is of the darker colour of the wing, giving the insect a very characteristic appearance as compared with its allies. As in the other species, the amount of black varies, but in this form a completely black-filled cell is the exception, while the uniform colour, free from contrasts, is the rule. My examples are from California, Washington and Oregon.

Rhynchagrotis lætula, Grt.

This is an ally of the preceding, even more sordid-luteous in colour, mottled with fuscous, and with the orbicular tending to close superiorly. I have only a single defective example from Corvallis, Oregon. It is also recorded from Washington and California.

Rhynchagrotis discoidalis, Grt.

Dull gray-brown in colour, mottled with smoky, the s. t. space darker than the other parts of the wing, cell blackish between the ordinary spots, orbicular round or oval rather than V-shaped, but incomplete superiorly and open to the costal colouring. I have it from various points in California, Stockton, Utah, and Fort Wingate, New Mexico. Dates are in

July and September. The species is one of the most characteristic of the series and easily recognized.

Rhynchagrotis niger, Sm.

Uniform, very dark smoky-brown, collar without lines or marks, transverse maculation of primaries almost lost, the ordinary spots marked only by the black filling in the cell; orbicular open to the costa. The species is very characteristic, but I have only the types—one from Pullman, Washington, the other from Moscow, Idaho, the former in May, the latter in July.

Rhynchagrotis emarginata, Grt.

I have 2 ♂'s and 1 ♀ that I have separated from *formalis*, and which agree with a figure made from the type of *emarginata*. There are specimens of *formalis* so close to this at first sight that I failed to discriminate between them in 1892, and Sir George F. Hampson has, more recently, fallen into the same error. *Emarginata* differs from the most evenly-coloured *formalis* in having the transverse lines maked on costa by geminate black dots, the costal area is not in the least paler, and there is no difference in tint between the base and upper portion of collar. In all these points my specimens and the drawing agree, and I have therefore restored Mr. Grote's name as referring to a good species.

Rhynchagrotis meta, Sm.

Of this neat little species I have only the two typical examples. It is very pale fawn-gray, washed with reddish, the median lines darker brown or even blackish. The costal area, while not paler, is of the palest gray on the wing, and the ordinary spots are defined by the reddish washing around them. The orbicular is V-shaped, open to the costa and like it in tint. The extreme tip of the collar is black, else the head and thorax are a rather rusty-red.

Rhynchagrotis mirabilis, Grt.

Easily known by the discolorous yellowish reniform and the black streak through cell and below median vein—a somewhat variable feature, by the bye. The disc of thorax is also more or less discoloured, as a rule, with lateral black lines to the discoloured area.

Rhynchagrotis variata, Grt.

Begins the series in which the ordinary spots are small, not discoloured; the orbicular round, or nearly so, and always complete, not open to the costa. The present species is perhaps the largest and broadest-winged of the series, with a base of lilac-bluish, over which is the prevailing wing colour, which ranges from a pale luteous to bronze-red in one direction and smoky-gray in the other. The terminal space is always pale, usually of the bluish base, and the broken median lines are usually accompanied by the same bluish shading, which gives the appearance of light, indefined bands across the wings. The characteristic appearance so imparted holds in all the variations of colour and makes the species almost unmistakable.

The series of 16 ♂'s and 11 ♀'s before me shows a beautiful range in coloration; the localities extending from Kaslo, British Columbia, on the north, to the Chiricahua Mts., Arizona, on the south, and from Glenwood Springs, Colorado, on the east, to the Sierra Nevada, California, on the west. The palest specimens are from California, the darkest from British Columbia. Dates are from June to August in the northern part of its range, and from July to October in Arizona.

Rhynchagrotis scopeops, Dyar.

A very characteristic form, similar in many respects to *variata*, but much smaller, narrower-winged and the unusually large ordinary spots annulate with the pale or bluish underlay. The wings have a mottled appearance, especially along the costa and basal area, which separates it from *placida*. Kaslo, B. C., is the type locality, and from it Mr. Cockle has sent me a few examples for examination. I have a single male from Newfoundland that I cannot separate, and which at present I believe to be the same species.

Rhynchagrotis placida, Grt.

This specific name has served as a blanket for all the smaller narrow-winged forms in which the terminal space is paler than the rest of the wing and the colours range from red-brown to mouse-gray, the grays predominating. There are really two forms concerned, the type *placida* with an obvious median shade line in both sexes, the other without this character. There are other differences in detail, but this is the most easily noted superficial feature. The range of *placida* extends through the northern United States and Canada from the Atlantic to the Pacific. I do not have it from any southern locality at present.

Rhynchagrotis negascia, n. sp.

Similar to *placida* in size and general appearance, but with less trigonate and more stumpy primaries. The absence of a distinct median shade has been already noted, and, in addition, the ordinary spots are smaller, the reniform especially tending to become narrow, oblong, with the angles rounded rather than kidney-shaped. The secondaries in both sexes are very evenly blackish, whereas in *placida* they are decidedly paler at the base, and in no case evenly blackish. The primaries have the appearance of being more densely scalded, and while finely powdered appear more even in general tint.

There is a large series of both sexes before me from Ft. Wingate, New Mexico, and another, collected by Mr. Buchholz from Yavapai Co., Arizona. Altogether of spread material there are 35 ♂'s and 47 ♀'s showing a remarkable uniformity in general characteristics, while yet the terminal space is contrastingly blue in some examples, nearly concolorous in others, and the predominating shade may range from creamy-luteous to brick-red in one direction and smoky or gray-brown in the other. The ordinary spots are usually a little darker and outlined by rather broad annuli of the ground colour.

Rhynchagrotis inelegans, Sm.

An extremely obscure species which is not really well located here, because it has a more obviously divided thoracic crest than the neighbouring forms. But the ordinary spots are complete, and all the maculation beyond the geminate basal and t. a. line is obscure. In the type the colour at base and extending along costal area is red-brown, darkening very gradually. In an example from Kaslo, which I take to be the same, the entire wing is very dark, almost blackish, and all the maculation is gone. More material is needed to fix the best place for this species.

Rhynchagrotis duanca, n. sp.

Blackish-smoky; head and collar faded, more yellowish, secondaries with a brownish shade. Primaries with all the transverse maculation lost or barely traceable; ordinary spots small, traceable by slightly paler annuli.

Expands.—1.22–1.36 inches ≐ 30–34 mm.

Habitat.—Stockton, Utah, IX, X; California.

Two ♂'s and 3 ♀'s in rather unsatisfactory condition, but obviously different from anything else in this series. It is narrower-winged than *nefascia*, and with the maculation almost all lost. I have a pair of specimens from Montana which are probably the same, but there is enough question about it to prevent my placing them in the type series.

(To be continued.)

NEW SPECIES OF NORTH AMERICAN HYDNOCERA (COLEOPTERA).

BY A. B. WOLCOTT, INDIANAPOLIS, IND.

The author has had in preparation a monograph of the genus *Hydnocera*, it being now evident that the results can not be published for some little time, and specimens having been sent out bearing MS. names, it is thought advisable to make known some of the most conspicuous forms among the new species.

Hydnocera cæruleipennis, n. sp.—General form of *pallipennis*, but more elongate and shining. Dark bluish-green, elytra bright blue-green; antennæ, palpi, all the tibiæ and front and middle tarsi pale testaceous, the two basal joints and club of antennæ, apices of palpi, labrum and posterior tarsi piceous, the front and middle tarsi slightly infuscate, all the green parts with metallic lustre. Antennæ short, moderately slender, mass acuminate at apex. Head with the large prominent eyes much wider than the thorax, very finely and densely rugulose, front densely clothed with short slivery white recumbent and long erect grayish hairs, a conspicuous bunch of long erect grayish hairs below the eyes. Thorax as long as broad, apical constriction strong, sides before the middle rather strongly dilatated, sides posteriorly nearly straight, strongly convergent, apical and basal transverse impressions strong, disc coarsely, densely but not very deeply punctate, slightly rugulose at sides, lateral foveæ large, deep, pubescence rather sparse, long, erect, gray. Scutellum densely clothed with semirecumbent grayish pubescence. Elytra covering the abdomen, scarcely wider at base than the head, twice as long as wide at base, humeri moderately prominent, sides straight, moderately narrowing to apex, apices separately rounded and dehiscent at suture, sides behind the middle and apices strongly serrate, pubescence rather sparse, gray, erect and semierect at base, becoming shorter, more dense and erect and recumbent toward the apices, very coarsely, deeply and slightly confluently punctate, punctures not smaller at apex and but slightly more confluent. Legs long, slender, posterior femora not nearly attaining the apex of elytra, clothed with long erect cinereous hairs. Meso- and metasternum densely clothed with short silvery white recumbent pubescence; abdomen more sparsely, with longer white hairs. Length, 3.75 mm.

Santa Rita Mts., Arizona, 5,000–8,000 feet. July. F. H. Snow.

This beautiful species is very distinct from all the known species of our fauna, the form of the prothorax agreeing very nearly with *pallipennis* and *affiliata*, while the elytra are much longer than in those species, and more coarsely punctured than in any other species with elytra attenuate. The elytra are feebly depressed at apical one-third, the apices being not perceptibly tumid, the depressed third of elytra is in certain lights of a brilliant cobalt-blue tinge.

Hydnocera fallax, n. sp.—Robust, not strongly convex, black, with greenish reflexions, feebly shining, elytra blue-black, a narrow longitudinal maculation at base midway between the scutellum and the humeri extending more than one-third the length of elytra, antennæ, anterior and middle legs and basal half of hind femora yellowish-testaceous, front tibiæ with outer margin piceous, hind tibiæ obscurely testaceous on outer margin, apical half of middle femora and tibiæ slightly infuscate. Pubescence rather sparse, moderately long, grayish and semierect, most conspicuous on head, thorax and posterior half of elytra. Head with large prominent eyes, one-fourth wider than thorax, front feebly and vaguely impressed, densely, finely rugosely punctate. Thorax equally as broad as long, apical constriction strong, sides moderately dilated, behind the dilatation strongly compressed, sides thence to base slightly divergent, apical transverse impressed line obsolete, subbasal impressed line short, ending each side in a feeble fovea, basal margin reflexed, lateral foveæ obsolete, densely, finely rugosely punctate, middle of disk rather more sparsely. Elytra slightly shorter than the abdomen, sides nearly straight, convergent from base to apices, apices obliquely rounded, narrowly dehiscent at suture, sides behind the middle and apices strongly serrate, punctuation moderately coarse, rather sparse and mostly well separated except at apical third, where they become dense and slightly rugulose, colour blue-black, each with a narrow yellowish-testaceous longitudinal stripe broader posteriorly, extending from the base midway between the humeri and the scutellum to basal third. inner margin of stripe parallel with suture, posteriorly dilated to twice the width at base. Length, 3.5 mm.

Colorado Springs, Colorado, 6,000–7,000 feet. H. F. Wickham.

This species might at first sight readily be taken for *humeralis*. It is, however, quite distinct, the thorax being longer, the elytral flanks strongly convergent toward the apices, and the form is more robust, finally the colour markings are of a different type.

The posterior femora extend slightly beyond the apex of elytra, but are shorter than the abdomen; the legs are sparsely clothed with long hairs.

Hydnocera Wickhami, n. sp.—Large, robust, moderately depressed, black, slightly bronzed, above subopaque, body beneath and abdomen moderately shining, head and thorax with greenish reflections. Head scarcely wider than the thorax, eyes large, ciliate, with long dark hairs, moderately prominent, labrum and labial palpi black, antennæ and maxillary palpi (except apical joint of latter) pale testaceous, antennæ moderately slender, extending nearly to middle of thorax, mass obtuse at apex, head very densely but not very coarsely rugose, frontal impressions very feeble, with a few semirecumbent short silvery white hairs, and longer erect grayish and black hairs. Thorax broader than long, apical constriction strong, sides broadly, not very strongly, dilated, posteriorly arcuately narrowing to base, apical transverse impression nearly obsolete, basal margin reflexed, a short, deep, transverse, submarginal impression at middle of base, disc with longitudinal nearly smooth space, elsewhere densely, coarsely rugose, lateral foveæ feeble, clothed in same manner as the head. Scutellum clothed with fine, rather sparse, short, whitish pubescence. Elytra much wider than the head, humeri obtusely rounded, sides straight, parallel, slightly shorter than the abdomen, apices obtusely, separately rounded, not serrate (merely a little irregular in outline), slightly dehiscent at suture, the pubescence forming a fascia behind the middle in which the silvery-white recumbent hairs are directed both posteriorly and laterally, remainder of surface with very sparse short white hairs and longer erect black hairs, the whitish hairs being most conspicuous at the humeri and apex, before the postmedian fascia coarsely, deeply but moderately sparsely punctate (the individual punctures well separated), behind the fascia the punctuation is coarse, less deep and more crowded, elytra not more strongly depressed toward the apices, which are not at all tumid. Body beneath and abdomen sparsely pubescent with long whitish hairs, abdomen rather coarsely, moderately sparsely punctate, posterior margins of ventral segments four and five broadly testaceous. Legs black, anterior tarsi and apex of tibiæ testaceous. Length, 6 mm.

Santa Rita Mts., Arizona. One specimen collected and sent to me by H. F. Wickham.

Only one other species of *Hydnocera* known to me exceeds this in length. *H. longa*, which is one millimeter longer, is of an entirely different form, the thorax being as long as broad, and the legs are also much more elongate.

Hydnocera bimaculata, n. sp.—Large, robust, moderately depressed, aeneous-black, upper surface feebly shining, elytra and body beneath moderately shining. Head very slightly wider than the thorax, eyes large, not very prominent, ciliate with long hairs, labrum, maxillary palpi and antennæ yellowish-testaceous, labial palpi piceous, the basal joint yellowish-testaceous, antennæ moderately stout, slightly longer than the head, mass obtusely rounded at apex, head very densely, moderately, coarsely punctate, frontal impressions feeble, very sparsely clothed with recumbent silvery-white pubescence and sparse, long, erect cinereous hairs. Thorax nearly one-fourth broader than long, apical constriction moderately strong, sides broadly, moderately strongly dilated, posteriorly nearly straight and convergent to base, apical transverse impressed line distinct, not deep, basal impressed line deep, extending from side to side, the basal submargin is carinate and the carina grooved, punctuation same as that of the head, at middle of apical margin finely, transversely rugose, middle of disc smooth, lateral foveæ feeble and punctured, pubescence similar to that of the head, but with the silvery-white pubescence semierect. Scutellum densely clothed with long, whitish, recumbent hairs. Elytra wider than head and thorax, humeri obtusely rounded, sides straight, moderately narrowing posteriorly, shorter than the abdomen, apices obtusely separately rounded, finely serrate, narrowly dehiscent at suture, behind the middle a rounded yellowish-testaceous maculation, which is densely clothed with transversely directed subrecumbent long whitish pubescence, the remainder of surface with very sparse recumbent white and long semierect gray hairs, the whitish hairs being most conspicuous at base, humeral regions and behind the postmedian maculations, surface before the maculations rather coarsely, densely and confluently punctate, behind the maculations moderately, coarsely scabrous, maculations finely and densely punctured, elytra from apical two-fifths to apex rather strongly declivous, apices not tumid. Body beneath moderately clothed with long whitish hairs, abdomen sparsely pubescent, body finely, densely punctate, abdomen more coarsely, less densely punctate. Legs dark, inner margin of front tibiæ, apex of middle tibiæ and front and middle tarsi pale testaceous. Length, 5.25 mm.

Amedee, Cal., 4,200 feet. Received from H. F. Wickham.

While closely allied to *Wickhami*, it differs in too many characters to allow its union with that species; the most conspicuous differences being in the sculpture and form of the elytra, the sides being convergent in this species, while in *Wickhami* they are parallel. It also differs from *Wickhami* in having the long, erect, black hairs of the upper surface wanting, the colour is different, and there is no trace of elytral colour markings in that species.

Hydnocera ornata, n. sp.—General form of *longicollis*. Black, shining; elytra each with a large basal maculation extending to the middle, attaining the lateral margins at base but rapidly narrowing posteriorly, narrowly interrupted at the suture, and with an obscurely clouded area near scutellum, a large somewhat irregular longitudinal maculation on lateral margin at apical third pale yellow. Pubescence rather sparse, long, semierect, white, front of head densely clothed with fine recumbent silvery white hairs. Antennæ and mouth pale yellow; eyes large, prominent, head very large, shining, coarsely, very sparsely and irregularly punctate, finely rugose above the eyes. Prothorax brightly shining, much narrower than the head, more than one-fourth longer than broad, nearly cylindrical, sides before the middle very feebly obtusely rounded, apical constriction moderate, sides parallel behind, lateral foveæ small, distinct, disc coarsely, very sparsely and vaguely punctate, sculpture somewhat rugulose at the sides. Elytra at base slightly wider than the head, humeri rather feeble, strongly attenuate, fully one-third shorter than the abdomen, dehiscent at suture, apices rounded and strongly serrate, tumid at apex, punctuation fine, nearly obsolete at base, more distinct but sparse at middle, the individual punctures well separated except on the tumefied portion, where they are very sparse and irregularly placed, some being confluent. Legs pale yellowish, clothed with long sparse white hairs. Length, 4.5 mm.

Santa Rita Mts., Arizona, 5,000–8,000 feet. Dr. F. H. Snow.

Closely allied to *H. Guatemalæ*, Gork., described from Guatemala, but that species has the elytral apices truncate, the pubescence short and depressed, and to judge by the figure (Biologia, III, 2, Tab. 9, fig. 3), has the elytra somewhat longer, prothorax shorter and broader, less cylindrical, and with apical and basal margins narrowly yellowish-white. *Ornata* differs from *longicollis* by the shorter thorax, sculpture of the upper surface and the colour pattern. The metasternal side pieces are densely clothed with short recumbent white pubescence. The posterior femora scarcely extend to apex of abdomen.

NEW AND LITTLE-KNOWN BEES.

BY T. D. A. COCKERELL, BOULDER, COLORADO.

Tetralonia fulvitarsis, Cresson.—At Boulder, Colorado, May 21, 1907, Mrs. C. Bennett took two females and a male of *Tetralonia* at flowers of vetch. The male is *T. fulvitarsis*, while the females are *T. frater aragalli*, Ckll. This suggests that *aragalli* is the female of *fulvitarsis*, and although I cannot prove it, I believe this to be the case.

Andrena ziziæformis, sp. nov.— ♀. Length about 7 mm.; black; head transversely oval, broader than long; clypeus shining, with sparse strong punctures; process of labrum broadly truncate; cheeks rounded, not large; front striatulate, with a prominent longitudinal keel; flagellum, except basally, clear ferruginous beneath; third antennal joint nearly as long as the following three together, these being very short; pubescence dull white, caudal fimbria pale golden; tegulæ testaceous; stigma and nervures clear ferruginous; legs dark brown, small joints of tarsi ferruginous. Exceedingly like *A. ziziæ* (specimen collected at Milwaukee by Dr. Grænicher compared), but differing as follows: Clypeus shining; flagellum much more slender basally; face broader; frontal keel longer and more prominent; facial foveæ grayish-white (not yellowish), very inconspicuous when seen from in front; thorax narrower, mesothorax with fine but evident punctures; second submarginal cell broader; first abdominal segment with very fine but evident punctures; second abdominal segment depressed about one-third; hair of abdomen whiter, and so more conspicuous.

Hab.—Falls Church, Virginia, May 30. (*Nathan Banks.*)

Melissodes saponellus, sp. nov.— ♀. Length about 11 mm., anterior wing not quite 8 mm.; black, with very pale ochreous hair; disc of mesothorax exposed centrally, shining and sparsely punctured, with the bordering hairs black, but easily overlooked; hair on inner side of hind basitarsus clear ferruginous; abdomen broad, the second and following segments all covered with pale ochreous felt-like hair, the second with a median dusky band, where the hair is thin enough to partially expose the surface; hind margins of the segments (tegument) pallid, that of the first slightly iridescent, and grading into the black through a red suffusion; hair of fifth segment and sides of sixth a very pale but warm reddish, not at all black or fuscous; eyes green; flagellum, except basally, bright ferruginous beneath; tegulæ shining piceous; maxillary palpi four-jointed, the last joint minute.

Superficially this looks exactly like a *Xenoglossodes*, and especially resembles *X. imitatrix*, Ckll. and Porter, from which it differs by the less convex outer edge of mandibles, the flagellum red beneath, the black hair on thorax above, and other small details. The two species are, I think, closely related, and it is doubtful whether they should be generically separated.

Among the species of *Melissodes*, it is most like *M. Stearnsi*, Ckll., but larger and without black or fuscous hair on the legs. It cannot be the undescribed female of *M. vernonensis*, Vier., as the latter has a very much broader second submarginal cell.

Hab.—Soap Lake, Grand Coulee, Washington State, June 29, 1902. (*A. L. Melander*, No. 9.)

Robertsonella Gleasoni, Titus.—The range of this little-known genus and species is greatly extended by two males taken by Mr. N. Banks in Virginia; Glencarlyn, May 4, and Falls Church, May 30. More ventral segments are visible than in the males of the allied genera.

HONEYDEW AND THE CORNICLES OF THE APHIDIDÆ.

BY C. P. GILLETTE, FORT COLLINS, COLO.

In Proc. of the Entomological Society of Washington, for Sept. to Dec., 1906, on page 114, is a discussion as to the source of honeydew in the Aphididæ. One not knowing the contrary might be misled by that discussion into thinking that the members of the society were inclined to believe that the cornicles are sometimes, if not commonly, the avenues through which this substance is expelled from the aphid body.

More than a century ago Mr. William Curtis, in his paper on "Observations on Aphides," etc. (1800), announced his discovery that honeydew is exclusively the product of Aphides, that it is their excrement, and that he "found it to proceed from the extremity of the abdomen."

He was in error, of course, in thinking that the Aphides are the only source of honeydew, but I do not know of any successful contradiction of his other two statements.

Buckton, in his "Monograph of British Aphididæ," figures an ant taking a drop from the end of one of the cornicles of an Aphid, and some later writers have copied the error.

In my studies of the plant-lice it often becomes necessary to pinch an adult between the thumb and finger to determine whether or not the specimen in hand is a male, an oviparous female, or a viviparous female.

One thing to be observed is usually the expulsion of a transparent drop of "honeydew" from the very small anal opening immediately beneath the base of the cauda. Waxy drops of white, yellow, brown, red or the deepest black fluid may usually be seen at the same time as they are expelled from the tips of the cornicles; and the embryos, the eggs, or the genital organ of the male, as the case may be, will be protruded from the large genital opening beneath the anal plate. (See figure.)

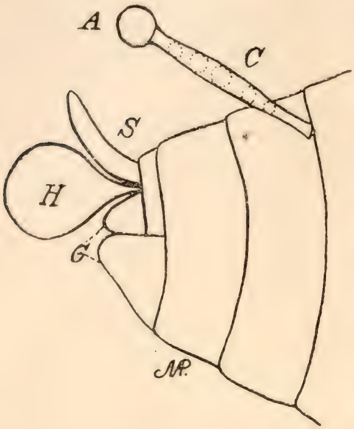


Fig. 13.—Abdomen of Aphid.

Neither the writer nor his helpers, who have been observing the Aphididæ rather carefully for a few years past, have ever found "honeydew" issuing from the cornicles.

There is properly but one anal and one genital plate, each beneath the aperture named, as shown in the illustration. Or these plates might be called supra- and infra-genital plates. And then the honeydew is expelled with considerable force free from the body, while the sticky drops that are expelled from the cornicles accumulate at their ends and may run down, but do not often free themselves from the cornicles. It is probably true that the exudation from the cornicles is somewhat protective. It is difficult, however, to believe that this secretion can be very effectual in defending the Aphididæ from the attacks of their predaceous and parasitic enemies.

In my observations the cornicles have always been found between the 5th and 6th segments of the abdomen, or upon the 6th, but they have not always been so drawn in published illustrations.

Explanation of Figure 13:

Terminal joints of abdomen of Aphid showing drop of honeydew; C, cornicle; A, drop of sticky exudation at end of cornicle; S, style or cauda; H, honeydew escaping from anal opening; G, two genital plates, between which is the genital opening. The superior of these two plates is properly the anal, or supra-genital plate, and the lower plate is properly the genital or subgenital plate.

NOTES ON THE NEW SPECIES AND VARIETIES OF RHOPALOCERA IN WRIGHT'S BUTTERFLIES OF THE WEST COAST.

BY KARL R. COOLIDGE, PALO ALTO, CALIF.

Mr. W. G. Wright, in his "Butterflies of the West Coast," describes thirty-two new species and varieties. A number of these, as shown by various reviewers, must be placed as synonyms, and others are but geographical races and aberrations. Unfortunately, the habitats given are vague and indefinite, and this appears to be particularly true of the new forms. The following are described and, with few exceptions, are figured :

PARNASSIDÆ.

10. *Parnassius smintheus*, var. *niger*, Wright.—This variety is founded on a single ♂, which is entirely destitute of red. Hardly worthy of varietal rank.

13. *P. smintheus*, var. *magnus*, Wright.—This is a large northern race of *smintheus*.

PAPILIONIDÆ.

25. *Papilio zolicaon*, var. *coloro*, Wright.—Described from a single specimen taken in the Colorado Desert. Differs from *zolicaon* only in deeper yellowish colour.

PIERIDÆ.

60. *Anthocharis deserti*, Wright.—Appears to be a small-sized desert form of *cethura*.

67. *Anthocharis mollis*, Wright.—I would consider this identical with *sara*.

70. *Anthocharis caliente*, Wright.—Described from a single female. It may prove to be a variety of *pima*, to which it comes closest.

NYMPHALIDÆ.

111. *Argynnis letis*, Wright.—A slight ♂ variety of *leto*.

119. *A. sordida*, Wright.—This is given as a variety of *Bremneri*, differing from the typical form in that the under surface of the secondaries has the white or buff spots more or less obsolete, and the surface is suffused with ferruginous. The specimen figured as *Bremneri* is *rhodope*, and hence we must consider *sordida* a variety of that species. No figure of *sordida* is given.

134. *A. laurina*, Wright.—An unsilvered variety of *laura*.

160. *Melitæa olancha*, Wright.—Similar to *chalcedon*, with which it is probably identical.

163. *Melitæa sierra*, Wright.—This species is given the indefinite habitat "Sierra Nevadas." Mr. E. J. Newcomer has given me several specimens of a *Melitæa* which agree well with the description of *sierra*. They came from Lake Tahoe (Eldorado Co., Calif.), at an elevation of about 6,800 ft, and were quite common in July.

170. *M. augustina*, Wright.—Merely an aberration of *augusta*.

178. *M. eremita*, Wright.—This is another species coming from one of Mr. Wright's hidden localities in Central California. Collectors in this vicinity have noted a *Melitæa* which has been rather common in the foothills here, and which appears to be *eremita*. It is rather doubtful, however, if *eremita* will prove to be a valid species.

179. *M. hermoso*, Wright.—This species is well named, as it is indeed one of the most beautiful of the genus.

180. *M. colonia*, Wright.—Described from Mt. Hood, Oregon.

181. *M. sabina*, Wright.—Described from a single battered and dilapidated specimen.

183. *M. abnorma*, Wright.—An aberration of *Hoffmanni*.

184. *M. mirabilis*, Wright. — Another aberration, evidently of *Hoffmanni*.

186. *M. leona*, Wright.—A variety of *leonira*; and may be *obsoleta*.

189. *M. cenita*, Wright.—From Southern California.

198. *Phyciodes pascoensis*, Wright.—A slight variety of *nycteis*.

212. *Synchloe Californica*, Wright.—A good series of this distinct species is figured.

222. *Grapta chrysoptera*, Wright.—Mr. Fordyce Grinnell (Ent. News, Nov., 1907) has recorded this species from the San Gabriel Mts., Southern California. The types came from Mendocino and Lake counties.

AGAPETIDÆ.

249. *Satyrus Stephensi*, Wright.—This fine species is described from Northeastern California.

LYCÆNIDÆ.

328. *Thecla avolona*, Wright.—From Catalina Island.

347. *Chrysophanus Del Sud*, Wright, = *hermes*, Edw. — (See Coolidge, Psyche XIV, Dec., 1907). It seems rather odd that Wright

should give a description of *hermes* on one page and then on the next describe *Del Sud*, which answers the description perfectly and comes from the type locality.

382. *Lycæna melimono*, Wright, = *Ly. emigdionis*, Grinnell, dimorphic ♀.—The two females b and c of *Ly. Shasta* also belong to *emigdionis*. As I have already pointed out (Ent. News, XVIII, p. 300), there is no ♂, Mr. Grinnell may have described it in error.

400. *Ly. sissona*, Wright.—A small species from Shasta County.

401. *Ly. astragala*, Wright.—Another tiny species, the type (a ♂) is unique.

HESPERIDÆ.

423. *Pamphila Californica*, Wright.—Found in Southern California.

441. *P. chispa*, Wright, = *P. Tecumseh*, Grinnell.

480. *Nisioniades lacustra*, Wright.—A synonym of *N. callidus*, Grinnell.

ANOTHER CHALCIDOID PARASITE OF A TICK.

BY L. O. HOWARD, WASHINGTON, D. C.

It will be remembered that in Entomological News for November, 1907 (pp. 375-378, fig. 1, plate XIV), the writer announced the unique breeding of a Chalcidoid parasite of the Ixodid, *Hæmaphysalis leporis-palustris*, collected by Mr. J. D. Mitchell, of Victoria, Texas, on a cotton-tail rabbit in Jackson County, Texas, and that the genus Ixodiphagus was erected for this species, which was called *I. Texanus*. It is now his pleasure to announce that another Chalcidoid has been reared from an Ixodid under conditions that leave no doubt as to the parasitic relation already so well established in the case of Ixodiphagus.

April 20, 1908, Mr. H. P. Wood collected numerous specimens of a brown tick from a small Mexican dog at Corpus Christi, and sent them to the Dallas Laboratory of the Bureau of Entomology. This tick proved to be *Rhipicephalus Texanus*, Banks, recently described in Mr. Banks's Revision of the Ixodoidea, or Ticks, of the United States, Technical Series No. 15, Bureau of Entomology of the U. S. Department of Agriculture, issued June 6, 1908. The ticks were placed in charge of Mr. W. A. Hooker, of the Dallas Laboratory, who informs the writer that among them there were thirteen engorged nymphs and several slightly engorged adults. Mr. Hooker further states that the adults were placed in tubes and the nymphs in a pill-box, all on moist sand. On May 4th, when examined, the nymphs appeared unusually swollen, so that parasitism was suspected, and they were immediately isolated in small tubes with absorbent cotton stoppers. The posterior portion of the body of the host soon became translucent, indicating that parasite larvæ were at that end of the body. The first adult parasites appeared May 22, and 51 specimens issued from five ticks on the 22nd and 23rd.

The full life-history of the parasite is not known, and the time and method of oviposition would be very interesting if they were known. It seems that it is the habit of the host to drop off the animal to which it is attached and to pass both moults on the ground. This would afford a good opportunity for the parasite to deposit its eggs while the young nymph is awaiting a host animal. From the fact, however, that a number of parasites issue from a single tick, there is a possibility of a polyembryonic method of development, in which case it is likely that the Chalcidid may lay its egg in the egg of the tick. The exact dates sent in by Mr. Hooker are as follows: April 16, approximately the date when the nymphs became attached to the dog; April 20 the engorged nymphs were collected; May 12 parasites pupated; May 22 the parasites began to emerge. Parasites were bred only from nymphs, and not from larvæ or from adults.

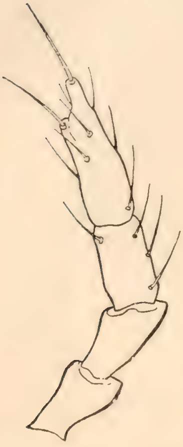


FIG. 14.—Hunterellus Hookeri, female—maxillary palpus.

The parasite appears to be rather closely related to Ixodiphagus, but will form a new genus. As pointed out in the article in Entomological News above referred to, Ixodiphagus belongs to the subfamily Encyrtinæ, but does not fit into any of its tribes. It will therefore be desirable to found a new tribe, Ixodiphagini, to include Ixodiphagus and the new genus Hunterellus, about to be described.

Family ENCYRTIDÆ, Walker (1837).

Subfamily ENCYRTINÆ, How. (1886).

Tribe Ixodiphagini, How.

HUNTERELLUS, gen. nov.

Female.—Differs from Ixodiphagus in the following respects: Head triangular when seen from side; antennæ inserted well above middle of face; face below insertion of antennæ well-rounded; distance between lateral ocelli and median ocellus greater than that between one of the laterals and the eye margin; maxillary palpi long; joints 2 and 3 subequal in length, and each as long as or longer than 1, joint 4 longer than 3.

Male.—Resembles female except in antennæ, in which the funicle joints are all of equal width, each somewhat longer than broad, and all well separated, with rounded bases and sharply truncate tips; moderately hairy; hairs not arranged in whorls.

Hunterellus Hookeri, n. sp.—*Female.*—Length, 0.85 mm.; expanse, 2.04 mm.; greatest width of fore wing, 0.35 mm. Head and mesonotum very finely shagreened, somewhat shining and furnished with many fine, short hairs. Mesopleura smooth, shining. General colour black. Antennæ dark fuscous. Front and middle tarsi and tibiæ dirty honey-yellow; hind tibiæ brownish in middle, honey-yellow at either end; front and middle femora light at distal end. Veins of wing dark brown.

Male.—Resembles female except in antennæ, which are lighter in colour. Described from four females and six males, reared May 22 from *Rhipicephalus Texanus* collected on Mexican dog at Corpus Christi, April 20, 1908.

U. S. National Museum, type No. 11,947.

PRELIMINARY REMARKS ON AMERICAN CORIZINI (HEMIPTERA).

BY C. F. BAKER, PARA, BRAZIL.

In Uhler's check list there appeared eleven North American species of this group, all under the genus *Corizus*. But one of these (*hyalinus*) had also been found in Europe. Two were species of Dallas, one of Say, two of Stal, and the remainder date from the monograph of the genus by Signoret, published in 1859 in the Ann. Ent. Soc., France. The descriptions of Signoret are largely drawn from colour characters, and have consequently been the cause of endless confusion and misunderstanding in the determination of the species. The colour forms are simply multitudinous "protean," as stated by Distant. In large series from all parts of North, Central and South America specimens may easily be discovered that exactly fit the descriptions of Signoret, but they are mostly mere links in vast intergrading series of forms. In collections where these forms are represented by but a few specimens each, they are extremely difficult to understand. And this misunderstanding is frequently strengthened by the fact that in a single locality races are likely to be found quite pure and uniform.

The way was paved to a proper understanding of the group by Stal in the "Enumeratio," where he separated from the old genus *Corizus* a number of subgenera, leaving under the original name only certain old species grouped around *crassicornis*. These subgenera were exceedingly well founded, since in a study of many species, other co-ordinated characters may be discovered which were not used by Stal. These groups are as well founded as the generally recognized and nearly related *Maccavethus*, *Brachycarenus* and *Corizomorpha*, and are much more readily separable than many other genera of the Coreidæ. For my own convenience I call them "genera." Apart from other considerations, however, a careful study of these groups of Stal is the only path towards bringing order out of the utter confusion in the arrangement of the species in most American collections.

I have already before me something more than a thousand specimens of this group. Many of these specimens have previously been studied by Dr. Uhler and Mr. Heidemann. I have made a preliminary arrangement of all this material, and shall be glad now to undertake the determination of other collections, adding to such collections forms lacking to them in return for any duplicates retained.

Genus Corizus, Fall.

But one species belonging to this genus, as limited by Stal, has ever been described for North America—*novæboracensis*, recognized by Fitch and described by Signoret. In American collections pale forms of this are commonly referred to *hyalinus*, which belongs in a different genus. *Novæboracensis* is one of the most distinct species in the American fauna, and is represented by various forms, especially towards the West. *Pallidus* is a very common pale form found from Colorado to Nevada, but it agrees in all essential characters with *novæboracensis*, and intergrades it throughout its range. Some of the commoner forms of this species may be temporarily separated as follows :

A. Smaller pale greenish forms; western............*pallidus*, Baker.

AA. Larger, darker, brownish to blackish forms.

  B. Scutel yellowish, whole insect pale brown;
    Nevada...........................*intermedia*, Baker.

  BB. Scutel brown to black, body of various shades of brown, but mostly dark.

    C. Length, 6–7 mm.; E. U. S. to Nevada.*novæboracensis*, Fh.

    CC. Length, 7–9 mm.; Colo. to Nevada..*occidentalis*, Baker.

  BBB. Scutel and most of the body above, with the legs,
    black.............................*plutonius*, Baker.

Genus LIORHYSSUS, Stal.

This genus has but one known American species, *hyalinus*, with numerous forms everywhere. In but few cases are these even geographical, since the same ones constantly recur in widely-separated localities and in all sorts of combinations. Only in the extreme south have I found any clearly-marked varieties. In Cuba all the individuals taken by me are very dark, with disc of pronotum almost black. Some of these southern forms deserve distinguishing names, if South American extensions of the species have not already been named. Uhler has described one of the western forms as *viridicatus*.

Genus NIESTHREA, Stal.

This genus contains the most highly-coloured species of the group, and is the largest genus in North America. Frequently small forms had been determined for me as *ventralis* and *sidæ*, but both of these, together with *scutatus* and *validus*, were originally described as about 10 mm. in length. The large forms constitute a well-defined series, which, with a large amount of material before me, I believe to be of but specific value. The *validus* of Uhler varies completely into the *scutatus* of Stal, which is one of the most common species of the Pacific Slope. *Ventralis* is but *sidæ* with lateral rows of black dots on each ventral segment. Large series collected in Nevada, Middle and Southern California and Mexico illustrate very clearly the relation between these large forms. The small forms of the genus known to me appear to belong to but three specific groups, but with many forms each; these are the *lateralis* of Say, the *pictipes* of Stal, and the *sidæ* of Fabricius. *Nigristernum*, recognized by Fitch and described by Signoret, I believe to be the merest colour-form of *lateralis*.

The typical form of *lateralis* is common in the Middle States, extending far to the east and far to the West, and presenting a number of conspicuous forms. Individuals more or less suffused with red may occur in almost any of the species, and especially in this. However, in the mountains of Southern California I found a uniform race of small roseate-hued individuals that certainly deserve separate recognition, and I have given them the form name *roseus*. The *luteolus* of Distant appears to be but a mere variety of *lateralis*. The *punctatus* of Signoret (determined at various times for me as *ventralis*, which is a far larger and paler form) ranges from the North-eastern United States into Mexico and Central America, and as a general thing is remarkably uniform for one of this group. I collected a smaller paler form in Nicaragua. Structurally, *punctatus* is extremely close to *lateralis*.

The specific group, *pictipes* of Stal, is essentially southern, forms of the species being abundant in West Indies, Mexico, Central and South America. I have many specimens of a very uniform race from Louisiana, and doubtless it will be found eastward and westward in the Gulf States. Most abundant in Nicaragua is the form of this species named *nebulosus*.

Genus ARHYSSUS, Stal.

Stal made *punctiventris* of Dallas the type of this group. The short antennæ, general form, and the very bristly head and thorax, are quite characteristic. After I had separated all of my material of this group, a search was made for determined *punctiventris*. Curiously enough, species were found in each of the other three genera which had been determined as *punctiventris*, but none in the group of which it had been made the type. Although published seven years previously, yet not one of the Dallas species is mentioned in the "Monographie du Genre Corizus." But I believe that Signoret had the true *punctiventris* of Dallas, and described it under the name of *Bohemani*. It is found throughout the United States, and occurs in most general collections of Heteroptera, though I have yet encountered no specimens properly named. *Pilosus* and *parvicornis*, both of which I have collected in the extreme south, have no good structural characters to separate them from *punctiventris* except size, and numerous intermediate forms occur. The *borealis* of Uhler had been reduced to *punctiventris*, but this reference is in doubt, since of various forms determined as *punctiventris* for me by Dr. Uhler, none are even *Arhyssus*.

GEOMETRID NOTES, WITH DESCRIPTIONS OF NEW SPECIES.

BY L. W. SWETT, BEDFORD, MASS.

Eupithecia Russeliata, n. sp.—Expands 13–16 mm., palpi ½ mm., general colour grayish white, antennæ not ciliated.

This species seems to vary in size and colour, but the markings remain distinct. Fore wings of a grayish white, with four distinct black patches on costa the beginnings of lines. The basal is indistinct and broken on the median vein, the intradiscal runs to inner margin in a series of waves, the discal spot is black, very large, round and prominent. The extradiscal line is rounded out below costa and opposite discal spot, appearing like dots on the veins and curving inwardly on vein 3 to inner margin. A pale broad band borders the extradiscal line, following the same course, then comes the marginal area, suffused broadly with gray, through which a narrow zigzag line runs to inner margin, fringe gray. Hind wings same colour as fore wings, with traces of five lines, the first three of which are shown only in dots on the inner angle, a small linear discal spot, then a broad dark dotted line accentuated on veins, rather irregular in its course, runs up to meet the extradiscal line of fore wings, beyond a broad pale band, then a dotted line taking the same course as the extradiscal, another pale band and marginal dots; fringe longer than on fore wings and grayish; body ash-coloured. Beneath paler than above, with the two extra bands very prominent, rounded out opposite discal spot and curving to about vein 5, then inwardly towards body. Hind wings the same except that the lines are more dotted on the veins, and the extradiscal makes a deep dip at about vein 4. This species seems to be quite widely distributed over the Atlantic region.

Co-types, 3 ♂s, 3 ♀s. Winchendon, Mass. (April 12), Dr. Russel; Framingham (April 23, '05), Mr. Frost; Taunton, Mass. (L. Swett), April 14; Newark, N. J. (Mr. Broadwell), April 6. I take pleasure in naming this species after my friend Dr. Russel, of Winchendon, Mass.

Eupithecia Brauneata, n. sp.—Expands 22 mm., antennæ very slightly ciliated beneath, palpi very short, general colour dark gray.

Fore wings dark fuscous-gray, a faint wavy inner band, then a broad dark band straighter on inner side than outer, on the outer has a projection opposite the discal spot, then runs irregularly to the inner margin. This is bordered with a pale band, then a narrow irregular line runs from costa, just outside the linear discal spot, to the inner margin, a broad gray area, then a black patch runs down from the costa sharply angled outwardly, with a narrow line represented by dots running straight to inner margin. A pale band beyond this of the same shape, with a faint line running through the centre; the edge of the wing is bordered broadly with fuscous through which a zigzag white line runs to inner margin, ending in two white twin spots. Hind wings dusky, with traces of lines, intervenular dots on both wings, fringe, intradiscal and extradiscal lines are broad and black, discal spot prominent as above, hardly noticeable on the hind wings, as they have above two broad wavy extradiscal bands ; and the edges of fore and hind wings have a dark border, which has a mottled appearance.

Types, ♂ and ♀, Mountain Lake, Va., June 14-21, 1907. The ♂ type is in Miss Braun's collection, the ♀, through her kindness, in my own.

Co-types, 2 ♀s, Mountain Lake, Va., June 14-21, 1907. Miss A. F. Braun, all in her collection.

This pretty and distinct species I have named after Miss Braun, who kindly sent me the specimens.

Eupithecia interruptofasciata (Packard).—This species was first described in the 5th Report of the Peabody Academy of Sciences, the types being two females, Texax (Belfrage), October and November. One male, Mass. (Sanborn) and two males, Albany, N. Y., (Lintner). This species Packard confused more than any other, and there were many labelled *interruptofasciata* in his collection which I knew by the localities could not be the types ; these he must have added when he wrote the Monograph. After a search I discovered the two female types with the correct date and locality, and agreeing with the description, but no males could I find, and finally I remembered that in many cases Packard returned the types to the owners after describing them, so, as the locality was Albany, I surmised they might be in the Lintner collection. I wrote to my kind friend, Dr. Felt, and he replied that the two male types were there, as the Lintner collection had been kept intact, and gave me additional information of great value. As I had to go on business to Albany, I determined to look over the types, and sure enough I found them with the correct labels, as follows : No. 1833, ♂, E. *interruptofasciata* (Pack.), and beneath a second label, *Eup. miserulata* (Grote), as if he doubted the species. The other male was labelled 1833a, ♂ ? and bore the same label as the first. After studying them carefully, I was surprised to find the two were different species, and both males, and also not conspecific with the two females at Cambridge, making three species under one name. The two female (Texas) types were alike, but the males were different species. The third male type (Mass.), Sanborn, I have been unable to locate, though it may come to light in some of the Boston Society of Natural History collections. The first male type, No. 1833 E, is quite large, has strongly-ciliated antennæ, long palpi, and pale outer extradiscal band strongly angulated below costa and prominent discal spot, wings dusky gray in colour. It comes rather close to my new species, *Eupithecia Grossbeckiata*, but is almost twice as large and with different markings. The second male, No. 1833a, is much smaller, of a dull gray, and markings much like the first, only the antennæ are simple and the palpi are very short. This is a male, though doubtfully labelled by Packard; so we have two males not conspecific, and, so far as I know, undescribed. I have retained the name *interruptofasciata* (Pack.) on the two female Texas types (Belfrage), Oct. and Nov., as they are conspecific and in Packard's own collection at Cambridge, Mass. I am not prepared to say what the two male Albany types are, except that at present they are undescribed so far as I know. Last fall I took the males of *E. interruptofasciata* in September, sparingly on the under side of White Pine limbs at Bedford, Mass., and they agree exactly with the Texas females, and have simple antennæ. I shall make my males co-types, and deposit one with Dr. Felt at Albany, so that he may have the species. Mr. Taylor sent me one some time ago, among some Eupithecias for identification, which I believe was bred by Dr. Fletcher on the Juniper; it is slightly more of a brownish cast, where mine are gray. Early in May I take a species, very close to *interruptofasciata*, yet there are marked differences, such as heavier extradiscal lines and no wave in it, but the species may be double-brooded and variable. This species, *Eupithecia interruptofasciata*, is easily told by the dashes on the veins from the extradiscal line, and the line itself, when near inner margin, is bowed inwardly towards the body. This I think settles the standing of this species, as I know every type but the Mass. (Sanborn). It is not common with me, as I only take about six specimens every fall, and the males are less numerous than females. I wish to thank Dr. Felt and Mr. Samuel Henshaw for valuable information and assistance, also Mr. Young, of Albany, N. Y.

ENTOMOLOGICAL SOCIETY OF ONTARIO.

The Entomological Society has held its regular meetings, as far as possible, every alternate week during the College year. The first meeting of the fall term was held on October 16th, and the last meeting of the spring term on March 18th.

As the headquarters of the Society are now at the Ontario Agricultural College, Guelph, a majority of the regular attendants are, as would be expected, college students who are interested in some form of insect study. This fact has naturally had considerable influence upon the choice of the subjects for the different meetings. It has been found that by careful selection of desirable subjects and by encouraging the students to take an active part in the preparation of such subjects and in the discussions that follow the reading of each paper, the meetings become of great value to them and supplement the regular class-room work. A gratifying amount of enthusiasm has been shown by the members of the Society throughout the year, and prospects are bright for still better work next year.

The following is a list of the papers read :

"The Cynipid Galls," by W. R. Thompson (3rd-year student).

"The Fight Against the Brown-tail Moth in Nova Scotia," by T. Brady (3rd-year student).

"Wing Classification of the Heteropterous Land Forms," by R. C. Treherne (3rd-year student).

"Parasitism," by G. M. Frier (4th-year student).

"Adaptations of Aquatic Insects," by L. Cæsar (4th-year student).

"Fungi that Attack Insects," by J. W. Eastham (Demonstrator in Botany)

"Insects as Carriers of Disease," by T. D. Jarvis (Lecturer in Entomology).

"Reminiscences of Entomologists Whom I Have Known," by C. J. S. Bethune (Professor of Entomology).

In regard to the above papers, it should be said that Mr. Brady's account of the "Fight Against the Brown-tail Moth of Nova Scotia" was given from his own experience in the Annapolis Valley in the summer of 1907. He was one of a number of men employed by the Government of the Province to combat this new pest, which had spread from the New England States and was rapidly becoming alarmingly abundant in the Annapolis Valley district.

Dr. Bethune's paper on "Reminiscences of Entomologists Whom I Have Known," was given in response to the request of the Society. On account of the doctor's wide and long-continued acquaintanceship with numerous famous entomologists, the members felt that an address of this kind would be very valuable in making them more intimate with the leading men in entomology and the work that was being done by them both in England and America to-day. The paper, though dealing with such a broad field, was full of the pleasure and profit that had been expected.—[L. CÆSAR, Secretary.

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RECENT WORK AMONG THE BORERS.

BY HENRY H. LYMAN, M. A., MONTREAL.

Since the publication in the September, 1905, number of this journal of my paper entitled "New Gortynas," a number of papers dealing with the same group of moths have appeared, which were naturally of great interest to me.

In the March, 1907, number of the Journ. N. Y. Ent. Soc. appeared a paper by Dr. H. G. Dyar, in which a new species was described under the name *Hydrœcia stenocelis*, that author apparently using the names *Hydrœcia*, *Papaipema* and *Gortyna* interchangeably.

The type of this species I saw during a recent visit to Washington, and it is certainly a very distinct species, which could not be confounded with any other form at present known.

But the papers of most interest to me were those which appeared in the August and September, 1907, numbers of this journal, from the pen of Mr. H. Bird. In these papers the author has described a number of very interesting species, and made a very considerable addition to our knowledge of this group, in which he has for years done so much good work.

Mr. Bird very truly says that the working out of life histories in this genus is a greater contribution to entomological knowledge than the mere description of new forms, and this, I take it, would equally apply in the case of most other genera. But Mr. Bird would not suggest that a species should not be described unless its life history had been previously unravelled, as he has himself described several species of which the early stages are unknown. Moreover, the conditions in this group are very different from those in most other genera, because these having boring larvæ, it is generally easier to find the larvæ than the moths, and in many cases the determination of the moths is difficult unless they have been bred.

In the September number Mr. Bird described the species boring in *Pteris aquilina* under the name *pterisii*. This species I have had represented in my collection by a single specimen taken by one of our

Montreal collectors in 1903, and I was convinced of its distinctness, but refrained from describing it from a single flown specimen, even though in good condition. In 1904 Mr. Winn bred a single perfect specimen from the Brake, which confirmed my belief in its distinctness, but Mr. Winn submitted his specimen to Mr. Bird, who pronounced it *purpurifascia*. It was also bred at Ottawa by some of the Ottawa entomologists, and on being submitted to Mr. Bird, he wrote that he knew the form "like a book," and that it was only a variety of *Harrisii*, and under that name it was listed in Dr. Fletcher's "Record." I tried to obtain the material to breed these three forms side by side, but before I succeeded Mr. Bird's description appeared.

It matters little who describes a species so long as it is well done, and I know of no one better qualified for the task than Mr. Bird, who has made himself so thoroughly master of this group. I cannot, however, congratulate him upon the name chosen. It was, perhaps, not unnaturally supposed that the name was intended in some way to indicate the food-plant, as in the case of *baptisiæ*, *thalictri* and *eupatorii*, but upon objection being made that the genitive of *pteris* should be *pteridis*, the author wrote that it was quite a mistake to suppose that the name was intended to indicate the food-plant, and that the species was dedicated to his pet cat which rejoices in the name Pterisius, and that those who spell *Harrisii* with a capital should do the same in the case of *Pterisii*. One may, perhaps, be pardoned for objecting, that, while this may satisfactorily account for the derivation of the name of the moth, the derivation of the name of the immortal cat remains obscure, but fancy bracketing Thaddeus William Harris with a cat! "That yellow, sickly brake" may or may not indicate the presence of this species, as I have examined more that had not been bored than that had. My experience with the larva has been limited to one season, but I have not found it especially parasitized, as out of five or six mature larvæ found, I obtained four moths.

Mr. Bird's statements in regard to my *Gortyna œrata* appear to me a little misleading. It was not I who referred it as a synonym of *nelita*, Strecker, but Dr. J. B. Smith, on account of which I made a special pilgrimage to Reading to see the types of Dr. Strecker's species, and not being able to discover any apparent difference beyond what might be expected between flown and bred material, and not being one of those who will never admit making a mistake, I reluctantly accepted Dr. Smith's reference, which, through the discovery by Mr. Bird of the true *nelita*, has been shown to have been erroneous.

Mr. Bird calls my statement that the usual longitudinal lines in the larva of *ærata* are all continuous "meagre," and suggests that as Burdock, from which I bred it, is very generally bored by *cataphracta*, the question may be open to possible error. Had I only found a larva which I supposed to be that of *ærata*, Mr. Bird's suggestion would be warranted, but seeing that I have bred the moth repeatedly from these larvæ, there is no peradventure in the matter. I have bred this form in four different years, and have secured thirteen moths, of which my six types and three other specimens are still in my collections, and the others have been presented by me to Mr. Bird, Dr. Fletcher, the British Museum and the National Museum at Washington, and I have an inflate of the larva kindly made for me by Mr. Gibson. My statement was merely made to show that it could be separated at a glance from the larva of *rutila* with which it was associated.

Mr. Bird refers to Burdock being frequently bored by *cataphracta*, and that is the case at Ottawa where *rutila* has not yet been found, but *cataphracta* has never been found boring in Burdock here, and was not known to occur here until I bred it from *Eupatorium purpureum*. When I found the larva in that plant, I thought I had discovered another new species, being misled by Mr. Bird's erroneous statement* that the larva is almost identical in markings with that of *nitela*, which he described as having the subdorsal lines absent from the first four abdominal segments, but on obtaining larvæ of *cataphracta* in Burdock from Ottawa from Mr. Gibson, I found that they were identical with mine from the *Eupatorium*.

Ærata I have only found in one limited locality in Westmount, a suburb of Montreal, and its existence there is threatened every year through the abominable practice of the municipal authorities of having the Burdocks along the edge of the street cut down, and its existence so far is probably due to its habit of boring in the lower part of the stalk, as I have sometimes found *rutila* boring in the upper part of the stalk and *ærata* in the lower part.

The following description of the larva of *ærata* was made on the 14th July, 1907, from a larva found boring in Burdock, near the root, on that date, the larva being apparently about half-grown.

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*Can. Ent., XXX., 129.

Length at rest 13-16 inch, in motion 15-16 inch. Head yellow brown, with a purplish brown line running down each side, being apparently the prolongation of the band of same colour below the subdorsal whitish stripe, and on it are the ocelli, but in some individuals this line is obscure. Cervical shield large, practically covering the whole of the first thoracic segment, yellowish, lighter than the head, edged on each side with purplish brown, the continuation of that shade below the subdorsal whitish line.

Colours of body practically the same as in *rutila*, being purplish brown, with dorsal and subdorsal pale cream colour or whitish stripes, which are not broken in any part, but are continuous from head to tail. The purplish brown of the first four abdominal segments has the appearance of being deeper in colour than on the rear segments, but this is partly owing to the whitish stripes being narrower on these segments than on those behind them. Warts strongly marked, darker than the purplish-brown ground colour, IV on the seventh abdominal segment being slightly above the level of the spiracle, setæ simple. Anal shield large, yellowish like the cervical shield.

On receipt of the specimen of *ærata* which I sent to the British Museum, Sir George Hampson wrote me that he considered it an unmarked form of *limpida*, Gn., but it appears to me that this must be at least doubtful until more is known of *limpida*, the types of which came from Illinois, especially as that species is not known to have an unmarked form, and in view of the extreme closeness of some of the species, as shown by some of Mr. Bird's more recent discoveries.

Mr. Bird next dealt with the forms which I described as *thalictri* and var. *perobsoleta*, pronouncing the latter identical with *frigida*, Smith, on the ground that there was "nothing in the description and nothing in the types, except the usual difference between flown and bred material" to separate the forms. I may be permitted to point out that it was on precisely identical grounds that my *ærata* was pronounced a synonym of *nelita*, Strecker, as we now know, through Mr. Bird's discovery, erroneously. Mr. Bird points out that in Dr. Smith's plates representing genital armature* Fig. 25 was supposed to be that of *cerussata*, while Fig. 26 represented *frigida*, Sm., and says that afterwards No. 25 was found not to agree with the structure of the true *cerussata*, but was later found to agree closely with that of my *thalictri*, which he considers a proof that *thalictri*, Lyman, and *frigida*, Smith, are identical. I may say that in examining Dr. Smith's specimens before publishing my description of *thalictri*, I recognized a specimen of that form standing among his specimens of *cerussata*, but I may be permitted to point out that while these two figures, 25 and 26, are similar, they are still distinctly different, and were regarded by Dr. Smith as representing distinct species.

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*Trans. Amer. Ent. Soc., XXVI., pl. I., II.

In reference to the great similarity of *cerussata* and *thalictri* which deceived Dr. Smith, I may mention that perfect bred specimens of the latter, some of which were afterwards used by me as types, were submitted by me and other Canadian entomologists to Mr. Bird, and in every case were pronounced by him *cerussata* "without any doubt," and that this opinion was maintained by him till I proved their distinctness. In view of these facts, his statement that "their resemblance to *cerussata* is striking for a species whose larvæ differ so obviously, and it is likely that flown examples of the one could easily be mistaken for the other," is, to say the least, refreshing in midsummer weather.

Mr. Bird's contention that if var. *perobsoleta* and *frigida* are identical there is no need of the name *thalictri* for the white-marked form, I consider absurd. The cases he brings forward of the differences between specimens of *speciosissima*, *Harrisii*, *inquæsita* and *purpurifascia* are in no sense parallel, as those differences are so slight as not to deceive anyone, and intergrades also exist, while no one who did not know that *thalictri* and *perobsoleta* belonged to the same species would have had any hesitation in describing them as distinct, and as far as known no intergrades exist, the case being exactly parallel to that of *nitela* and *nebris*, as Mr. Bird has admitted in correspondence. As long, therefore, as the names *nitela* and *nebris* both stand, so long will *thalictri* stand for the form to which I applied it. Dr. Fletcher having submitted to Sir George Hampson two specimens from Manitoba which he thought might be the true *frigida*, Sir George, on comparing them with a coloured drawing of the type of *frigida*, pronounced them the same, and quite distinct from *thalictri*. Being extremely interested in the matter, I made a trip to Washington, primarily to settle this question, taking with me types of *thalictri* and var. *perobsoleta* and the best one of Dr. Fletcher's specimens. On the first glance I thought Sir George's determination correct, as in colour and general appearance they agreed, but on a close study I was forced to agree with Dr. Dyar that they were distinct, as the course of the t. p. line in Dr. Fletcher's specimen was different.

As to the type of *frigida*, I could not say that it was identical with my *perobsoleta* on account of its very poor and worn condition, nor, from the same cause, could I pronounce it distinct. The course of the t. p. line seems identical, and I admit that they may probably be the same, but at the same time Mr. Bird has demonstrated that there are a number of cases in this group where distinct species could not be separated if in as poor condition as is the type of *frigida*, and I think it a pity that a species should be founded on a single specimen in such poor condition.

On my return home I reported the results of my examination to Dr. Fletcher, and suggested his describing his specimen as a new species, but he declined to do so, but added that I was welcome to do it, and to keep the type, and I, therefore, describe it as follows :

Gortyna Aweme, n. sp.

Alar expanse, 33 mm. Primaries, what Guenée called "gris-incarnat" (grayish flesh-colour), very similar in tone to those of *immanis*. Base of wing light brown, beyond which between the basal and t. a. lines there is a darker transverse shade, most distinct on the costa, and not reaching the inner margin. The t. a. line runs first almost at right angles to the costa, then curves inward and then outward, not quite reaching the inner margin. The t. p. line is strongly curved outwardly around the reniform, and then sweeps down to the inner margin, meeting it about at right angles. The orbicular is very small, even minute, and consists of a dark brown ring with light centre, the claviform is obsolete, the reniform is shaped like the figure 8, but is solid dark brown.

The median shade is bent almost at a right angle, the apex of the angle touching the lower lobe of the reniform, whence a dark shade strikes inwardly almost to the orbicular and a little below it. The dark colour of the t. p. line runs out a little on the nervures, and the space between the t. p. and s. t. lines has a slight tinge of mauve, which runs up to the apex. The s. t. line is not very distinct, and the space beyond it and below the apex is dark brown, which shade fades out towards the hind angle. Secondaries decidedly lighter than in *immanis*, so that there is more contrast with the primaries than in that species, and there is a faint and incomplete waved line partially crossing the centre of the wing.

Below, the wings are light in colour, slightly darker on the costa of both primaries and secondaries, and the former have a dark shade on outer margin and an indistinct transverse bar representing the reniform above. Secondaries without any markings. Type, 1 ♀ taken by Mr. Norman Criddle at Aweme, Man., in my collection.

At Washington I also made the following notes on the types of species recently described by Dr. Dyar :

Gortyna nepheleptena agrees with a form taken at Ottawa by Dr. Fletcher and pronounced *marginidens* by Sir George Hampson, and "near" that species by Dr. J. B. Smith.

Gortyna nephasyntheta appeared to me to be probably a worn *marginidens*, with reniform a trifle more solidly white than usual.

Gortyna anargyrea comes very near to *pterisii*, but the stigmata are yellow-brown intead of white.

Gortyna triorthia is *pterisii*, Bird, as admitted by Dr. Dyar.

Gortyna ochroptena is much like a washed-out *serrata*, but the white markings are smaller.

I also saw a co-type of *duplicatus*, Bird, described in the last January number of this journal, but the author cannot be congratulated on this name, as the feminine form *duplicata* would have been more appropriate.

CORRECTION.—If allowable, I should like to make the following correction in my paper on " New Histories and species in Papaipema (Hydrœcia) " in the January number : page 25, line 27 and page 28 line 35, for *duplicatus* read *duplicata*.—HENRY BIRD, Rye, N. Y.

IGNOTUS ÆNIGMATICUS.

CORRECTION.—By some oversight, the name of MR. FREDERICK BLANCHARD was omitted on page 214 (July number). It should have been inserted after the title " The Characters of Ignotus," as this portion of the paper, as far as the middle of page 219, was contributed by him, at the request of Mrs. Slosson, the writer of the article, " A Bit of Contemporary History," and of the description of the species *ænigmaticus*. Mrs. Slosson has written to the Editor, expressing her great regret that she did not observe this omission when reading the proof of the article. She is anxious that the fullest credit should be given to Mr. Blanchard, who so kindly prepared the careful diagnosis of the characters of this remarkable insect.

THE QUEBEC SOCIETY FOR THE PROTECTION OF PLANTS.

At a meeting held at Macdonald College on June 24th, a new Society called the Quebec Society for the Protection of Plants from Insects and Fungous Pests, was organized. The following officers were elected :

President—Prof. W. Lochhead, Macdonald College.

Vice-President—Frere Liguori, La Trappe, Oka.

Sec. Treas.—Douglas Weir, Macdonald College.

Directors—Rev. Dr. Fyles, Levis, P. Q.; Rev. G. Ducharme, Rigaud, P. Q.; Auguste Dupuis, Village des Aulnaies ; A. F. Winn, Montreal ; Dr. W. Grignon, Ste. Adele.

Curator-Librarian—J. M. Swaine, Macdonald College.

A substantial grant has been given the Society by the Department of Agriculture of Quebec.

Among those present at the meeting were : Rev. Dr. Campbell, Montreal ; Rev. Dr. Fyles, Levis ; Rev. G. Ducharme, Rigaud ; Dr. J. W. Robertson, Ste. Anne de Bellevue ; Frere Liguori, La Trappe, Oka ; Norman Jack, Chateauguay Basin ; Peter Reid, Chateauguay Basin ; Dr. W. Grignon, Ste. Adele ; Prof. W. Lochhead, Macdonald College ; J. M. Swaine, Macdonald College ; Prof. F. C. Harrison, Macdonald College ; Dr. J. L. Todd, Macdonald College ; Douglas Weir, Macdonald College ; Prof. S. Blair, Macdonald College.

Letters were received from Abbe Huard, Quebec ; Dr. Fletcher, Ottawa ; H. H. Lyman, Montreal ; Mr. Chagnon, Montreal ; Auguste Dupuis, Village des Aulnaies ; Mr. Delaire, St. Hyacinthe ; A. L. Tourchot, St. Hyacinthe, expressing their approval of the formation of the Society, and their regrets that they could not attend, through pressure of other duties.

The success of the new Society is practically assured on account of the interest manifested by both French and English workers. It is truly provincial in its aims, work and membership. There will be two meetings each year, a general winter meeting at Macdonald College for the transaction of necessary business, the reading of reports and papers, and a general review of the year's work ; and a summer field meeting at some outside point in the Province of Quebec. As the Society exists for the benefit of the Province, it is urged that all outbreaks of insect and fungus pests be reported to the Secretary of the Society, Macdonald College, so that possible help may be given promptly.

REMARKS ON SOME NEW PSELAPHIDÆ.

BY THOS. L. CASEY, WASHINGTON, D. C.

The systematic descriptive compilation of all the known genera of Pselaphidæ, with catalogue of species, by Mr. Achille Raffray, recently published as one of the series of the "Genera Insectorum," by Wytsman, is an epoch-making work, and one that should be very highly valued. The same exquisite drawings of these marvellous little animals that we have become accustomed to associate with the various papers of the author, and which could only emanate from an unusually skillful artist thoroughly in love with his subject, are even more numerous and more carefully elaborated than in any other of his publications. The many figures representing anatomical details must have cost the author much time and patience, and of them no element of praise, from any point of view, could be superfluous. It is only to be regretted that the proof-reading of the publishers is not all that could be desired, and the text therefore bristles with typographical errors and inconsistencies which must surely try the good temper of the author, who informs me inferentially that this will be the concluding monument to his memory; but that he may be mistaken in this, and that he may live to give us many more important papers, is the earnest wish of his numerous friends.

Of the 31 Pselaphid genera proposed by the present writer, 21 are adopted and 10 rejected; one of these rejected genera is, however, admitted to be valid, though under another name. I am sure that my long-time friend, David Sharp, would be one of the first to repudiate the inadvertent violation of the laws of priority on page 53, where *Thesium*, Csy., is made a synonym of *Apothinus*, Sharp, although the former was published in 1884, and the latter did not see the light until 1887. There are therefore 22 genera considered valid to 9 held to be synonyms. Of these nine rejectamenta three, *i. e.*, *Rafonus*, *Pycnoplectus* and *Zolium*, are plainly distinct genera, as may be realized very readily in the case of *Rafonus* by comparing the figure of a typical species of *Sonoma*, published in Bull. Cal. Acad., 1887, and that given for the type of *Rafonus* (*Faronus tolulæ*, Lec.), on plate I of Mr. Raffray's work. In *Pycnoplectus* the head is wholly different from that of *Euplectus*, where there are two approximate foveæ continued longitudinally forward in feeble grooves, which sometimes unite with a conspicuous transverse rectilinear impression behind the frontal margin, and between the supra-antennal foveæ marking the extreme sides of the front ; in *Pycnoplectus* there are two much larger, widely-separated foveæ, connected by a large and deep narrowly-parabolic sulcus, giving a habitus not remotely resembling that of *Euplectus*. *Zolium* has a deep sulcus on the flanks of the elytra, proceeding from a subhumeral pit not even suggested in *Melba*, and the modifications of the head are also different. I have no doubt at all that these three genera are valid, thus leaving six genera which alone are probably synonyms or subgenera; these are : *Faliscus*, *Nicotheus* (not *Nicothæus* as printed in the work under discussion), *Nisa*, *Pytna*, *Actiastes* and *Dalmosella*, although each of the last four refers to a specially-modified group, *Nisa* being peculiar in the terminal joints of the male antennæ, *Pytna* in having carinæ on the under surface of the femora instead of the spines of typical *Tyrus*, *Dalmosella* in its very much more slender and parallel form than in any of the species of *Melba*, where the hind body is constantly inflated, and *Actiastes*, differing from *Actium* in the markedly different position of the cephalic foveæ. These four probably represent subgenera therefore.

Ogmocerus, Raffr.

This genus includes some of the largest known Pselaphids and is confined to the continent of Africa, where individuals of all the four or five species hitherto described are exceedingly rare, being represented by uniques at present.

Ogmocerus Raffrayi, n. sp.—Form stout, moderately convex, piceous-black, subopaque, the elytra and abdomen feebly shining and very finely, rather closely punctulate ; head and prothorax coarsely, very densely, punctato-scabrous, the former longer than wide, oval, moderately narrowed to the broad neck, where there is a tuft of dense setæ at each side ; foveæ large but obscure ; eyes small, before the middle ; front narrowed, parallel, flat, inclined upward, the median depression at apex moderate ; antennæ nearly as long as the entire body, the cylindric basal joint feebly sigmoid, as long as the head and prothorax combined, two to eleven together gradually and moderately enlarged, with straight sides, becoming decidedly stout at the antennal apex, second joint as long as wide, third shorter than wide, fourth a third, fifth and sixth one-half, longer than wide, seventh a little less, eighth about as long as wide, its apex angulate, ninth and tenth a third wider than long, the eleventh oval and as long as the two preceding, all the joints herissate with moderate setæ; prothorax wider than the head, a fifth wider than long, obtrapezoidal, with a deep impression at each side behind the middle; elytra much wider, slightly transverse, with humeri longitudinally tumid dorsally, the fine discal stria extending to apical sixth ; abdomen as wide as the elytra and distinctly longer, rather strongly convex toward the median line, broadly margined ; legs long and thick, especially the femora. Length, 3.75 mm.; width, 1.3 mm. Liberia (Mt. Coffee).

A description of this species was sent to Mr. Raffray more than a year ago, and in reply I was informed that it pertained to a species different from any yet described ; so it gives me pleasure to dedicate it to that accomplished specialist.

Brachygluta, Thoms.

The following species belongs to the group containing *arizonæ*, *texana* and *loripes*, distinguished by the greatly-developed basal tergite of the males, this being the only segment visible from a dorsal viewpoint.

Brachygluta jacobina, n. sp.—Convex, the hind body much inflated, the anterior parts relatively slender, convex, bright testaceous, shining, having distinct subdecumbent yellowish pubescence ; head a little wider than long, the three pubescent foveæ distinct, the eyes large, convex and subbasal; antennæ half as long as the body, rather slender, the club gradually enlarged, the last joint as long as the preceding three, oval ; prothorax slightly transverse, equal in width to the head, strongly constricted behind the middle, the three pubescent foveæ strong and normal ; elytra distinctly shorter than wide, still more transverse in the female, expanded posteriorly, the humeri rounded, the fine discal stria extending toward tip ; abdomen of the male with the first dorsal transverse, much shorter than the elytra, with its apex broadly sinuate and deflexed, the median part of the apex thinner and punctureless, the second dorsal short, obliquely bi-impressed at the middle, its apex also very broadly but extremely feebly sinuate, with the edge thinned ; hind tibiæ feebly bent distally. Length, 1.35 mm.; width, 0.65–0.7 mm. California (San Diego).

The female is a little smaller, notably more slender and with more abbreviated elytra than the male, having the abdominal segments normal, several behind the first being visible from above. This species differs from *loripes* in its less obese form and shorter first tergite, with less prominent and more broadly sinuate apex in the male.

Batrisodes, Reitt.

A very large genus possessing two types in America, one with the head and antennæ of the males curiously modified and in very diversified manner, this type occurring in the Atlantic regions, and the other having little or no sexual modification of the head and antennæ, but with a very large cavity near the apex of the male abdomen, this occurring only in the true Pacific coast fauna. The polarity theory of sexual characters, enunciated, I believe, by LeConte, is well illustrated by these two classes of males. The following species deserve notice at the present time:

Species of the Pacific regions.

Apart from *monticola*, distinguished by its deep black colour, *occiduus*, distinct in its short and rapidly-widening elytra, and *cicatricosus*, *denticauda* and *pygidialis*, characterized by peculiarities of sculpture and by the structure of the pygidium, there are at hand six closely-allied smooth polished species, which may be distinguished among themselves as follows:

First dorsal segment with the two median basal elevations prolonged for some distance posteriorly in slender carinæ. Species of the interior and more elevated regions 2

First dorsal with the two basal elevations not or scarcely at all prolonged posteriorly. Species of the coast regions.................. 4

2. Abdominal carinæ separated by a distance which is distinctly less than that separating either from the inner line of the lateral margin. Nevada (Reno)..............................*zephyrinus*, Csy.

Abdominal carinæ more widely separated, the distance between them about equal to that separating either from the inner line of the lateral margin; body a little stouter, the antennæ rather more slender....3

3. Anterior transverse margin of the abdominal excavation of the male feebly and narrowly arcuate and produced at the middle. Shining, subimpunctate, sparsely but rather coarsely pubescent, testaceous, though much darker than *zephyrinus*, the head and antennæ nearly similar and of the usual type in this group; prothorax somewhat longer than wide and a little narrower than the head, the median sulcus distinct to anterior two-fifths; elytra nearly as long as wide, broadly arcuate laterally, arcuately converging at the sides basally, the humeri moderately tumid longitudinally; three basal foveæ on each distinct, equal and perforate, the two inner very approximate, a

few rather coarse but feeble punctures basally; abdomen as wide as the elytra, but not quite so long, slightly narrowed basally to the elytral apex. Length, 2.25 mm.; width, 0.8 mm. California (Lake Tahoe), also northward to Washington State.......*lustrans*, n. sp.

Anterior transverse margin almost straight, the excavation slightly larger than in *lustrans* and more transverse. Body throughout nearly similar, except that there is no evident median pronotal sulcus before the fovea, the elytra not so inflated, and with less arcuate sides, the sides evenly converging to the base, without trace of humeri from a vertical viewpoint, the surface very minutely, sparsely punctulate throughout, the two inner of the basal foveæ separated by their own diameter; abdomen similar in form, as long and wide as the elytra; colour very dark testaceous, the surface highly polished throughout. Length, 2.1 mm.; width, 0.76 mm. California (Tulare Co.)..............................*Tulareanus*, n. sp.

4. Abdominal excavation of the male somewhat oval, about as wide as long, its anterior transverse margin straight; body larger and stouter; ninth antennal joint about as long as wide. British Columbia (Vancouver to Metlakatla)......................*Albionicus*, Aubé

Abdominal excavation rounded, its anterior margin slightly arcuate medially but scarcely observably so; body much smaller and more slender, the ninth antennal joint evidently transverse. California (San Francisco to Sta. Cruz).....................*speculum*, Csy.

Abdominal excavation much larger, decidedly transverse, its anterior margin conspicuously arcuate and broadly projecting; body otherwise nearly as in *speculum*, except that it is not quite so slender, and rather more coarsely pubescent. California (Soda Springs, Anderson Valley, Mendocino Co.)..........................*Mendocino*, Csy.

Occiduus, Csy., belongs very near *speculum* and *Mendocino*, but is readily distinguishable by its shorter and more rapidly expanded elytra, much longer abdomen and shallower abdominal excavation of the male than in any of the above species; it occurs in Humboldt Co., California. *Pygidialis*, Csy., and *cicatricosus*, Bndl., are evidently very closely allied, having the same very coarse scar-like elytral punctures and denticulate humeri; actual comparison of the types will be necessary to decide this perhaps, if the language of the description of the latter should prove to be misleading.

Species of the Atlantic regions.

The following species are described in every instance from the male alone :

Batrisodes declivis, n. sp.—Form, coloration and sculpture nearly as in *fossicauda*. the abdomen having the same gradually pointed form; head similarly gradually and evenly declivous from the interfoveal convexity to the clypeal apex, without break in continuity, and coarsely, densely punctato-scabrous, the small and fine ambient sulcus similarly feebly indicated, the antennal prominences feeble ; clypeal margin evenly and broadly arcuato-truncate throughout the width ; antennæ similar, except that the penultimate joint is subglobular and less transverse, and having on its under surface a large deep circular pit in basal two-thirds, the eleventh joint slightly narrower than the tenth, elongate, gradually pointed ; prothorax obtrapezoidal, slightly elongate, decidedly narrower than the head ; elytra similar, having finely denticulate humeri ; abdomen distinctly narrower than the elytra but equally long ; pygidium similarly excavated across its lower portion but more obtuse from a dorsal viewpoint ; abdomen with a small and feeble apical indentation, which is shallower posteriorly. Length, 2.1 mm.; width, 0.78 mm. Iowa (Iowa City), H. F. Wickham.

Resembles *fossicauda*, Csy., but differs in antennal structure and in in its much wider head, with larger and more prominent eyes ; the head in *fossicauda* is not wider than the prothorax.

Mr. Raffray places *fossicauda*, on page 159, as a doubtful synonym of *bistriatus*, Lec. It is rather difficult to understand the necessity for this surmise, in the absence of accurate data, but to set the matter right, I may say that there are numerous important points of difference between these two species ; the front, for example, is more declivous anteriorly than superiorly, and not evenly declivous from the occiput to the clypeal margin, as it is in *fossicauda* and *declivis*, and the peculiar transverse pygidial excavation of those two species does not exist.

Batrisodes appalachianus, n. sp.—Form as in *punctifrons*, darker in colour, nearly black, the prothorax rather more inflated at the sides and fully as wide as the head, if not somewhat wider, the latter similar except that the flat declivous front is less uniformly punctate, more sparsely so medially than laterally, and bearing, not short and very coarse bristles as in *punctifrons*, but fine, short and inconspicuous hairs, the apex narrower and rectilinearly truncate, not broadly arcuato-truncate as in that species, the clypeus with its pubescent median tubercle and the antennæ nearly similar, the latter still more elongate, with the large terminal conoidal joint similarly simple and not excavated beneath ; elytra a little more elongate, as long as the abdomen, the humeral elevation not denticulate ; pygidium and abdomen similar. Length, 1.95 mm.; width, 0.7 mm. Pennsylvania (Westmoreland Co.).

Very close to *punctifrons*, but the character of the frontal sculpture, and particularly the pubescence of the frontal slope, is markedly different. Another species of this group is represented in my collection by a single female taken at Cincinnati by Mr. Dury.

Batrisodes tridens, n. sp.—Dark castaneous, the elytra brighter testaceous, subimpunctate, the pubescence long, coarse and distinct; head large, subquadrate, wider than long, carinate at each side above, the eyes rather small, not very prominent, the large nude foveæ and ambient sulcus as usual ; frontal margin transversely bilobed, the intermediate broad sinus having, at the lower margin of the sinuosity, a short lamina as in *striatus*, except that here it is tridentate, the clypeus separated from the upper front by the same transverse excavation, and having at each side a large and sharply-angulate wing, the lower conical part of the clypeus rounded at apex, having on its upper part between the alæ a tubercle which is biseriately setulose, and, in addition, with a very large porrect and transversely projecting yellow seta at each side ; antennæ moderate, the basal joint large, strongly rounded beneath, compressed and bearing on its anterior face a large oval concavity, which is minutely granulato-punctate, second to eighth cylindric, second longer than wide, intermediate joints as long as wide, ninth larger, transverse, tenth large, subglobose, wider than long, scarcely modified on its under surface, though apparently with a small rounded subbasal areola, eleventh conoidal, not quite as wide as the tenth, acutely pointed, unmodified ; prothorax of the usual form, not quite as wide as the head, tristriate and with two short discal carinæ ; elytra with oblique and prominent denticulate humeri ; abdomen unmodified at apex. Length, 2.1 mm.; width, 0.78 mm. Missouri (St. Louis).

This fine species evidently belongs in the vicinity of *striatus*, Lec., but differs in its paler coloration, tridentate median frontal lamina and concave basal joint of the antennæ among other characters.

Cavicornis is taken in some abundance by Mr. Dury near Cincinnati, and *globosus* is also common there; the latter is apparently the most abundant and one of the most widely-diffused species of the genus. *Frontalis*, Lec., is the largest and finest species known to me, and is also widely diffused, though less common; all my examples are males, and were taken in Pennsylvania, Missouri and Wisconsin.

Pycnoplectus, Csy.

The species of *Euplectus*, as regarded by Raffray, were divided by the writer (Ann. N. Y. Acad., 1893, p. 454) into three groups, then held to be subgeneric. Subsequently (l. c., 1897, p. 552) cogent reasons were given for regarding the first of these groups as of full generic value, and I am even more convinced of the correctness of this course now than then. It may be added that the third group, there composed of *pertenuis* alone, is also a distinct genus to be described subsequently.

Pycnoplectus Floridæ, n. sp.—Moderately stout, bright testaceous throughout, polished, impunctate, moderately and somewhat sparsely pubescent ; head wider than long, the eyes well developed, convex, at rather less than their own length from the base, the tempora moderately converging and rounded ; two pubescent foveæ separated by fully half the total width, the ambient sulcus very coarse and deep, triangular in course, with the apex narrowly truncate behind the thick and medially depressed frontal margin ; antennæ a little longer than the head and prothorax, the last three joints very gradually wider ; occiput feebly and narrowly impressed at the middle ; prothorax wider than long, as wide as the head, the three subbasal and single discal foveæ well developed ; elytra about as long as the head and prothorax and much wider, rather longer than wide, the basal impression obsolete at basal fourth, the intermediate basal fovea small but distinct ; abdomen not quite as wide as the elytra, and evidently longer, the first two dorsals impressed and bicarinate medially at base. Length, 1.3 mm.; width, 0.3 mm. Florida.

Resembles *Hudsonicus* somewhat, but much more completely impunctate, and having more elongate antennæ and relatively longer elytra.

Pycnoplectus longipennis, n. sp.—Form somewhat as in *Floridæ*, slender, similarly impunctate, polished and moderately convex, dark testaceous, finely, not conspicuously pubescent, the hairs decumbent; head but little wider than long, nearly as in *Floridæ;* prothorax much less transverse and decidedly narrower than the head, but little wider than long, the subbasal foveæ distinct, the discal moderate and slightly elongate; elytra a little longer than the head and prothorax and very much wider, somewhat longer than wide, perceptibly wider at apex than at base, the basal impression broad, becoming obsolete a little beyond basal third; abdomen as in *Floridæ*. Length, 1.3 mm.; width, 0.35 mm. Pennsylvania (Westmoreland Co.), P. Jerome Schmitt.

The male has the fourth ventral—not the fifth of Raffray—simple, the fifth with a posteriorly arcuate flat elevation in basal half and median seventh, the sixth broadly, feebly and simply impressed, and the seventh, or rhomboidal ventral pygidium, large, convex and medially carinulate.

Pycnoplectus impressiceps, n. sp.—Body more linear and much stouter, rather convex, the hind body less decidedly wider than the anterior parts, the pubescence moderately long and conspicuous, similarly dark testaceous, shining and subimpunctate; head nearly similar, the eyes a little larger, the ambient sulcus deeply impressed, especially anteriorly, the sides of the upper surface feebly and coarsely undulato-rugose but not punctate; prothorax much wider than long and fully as wide as the head, the discal fovea very deep, somewhat oval; elytra somewhat shorter than the head and prothorax, and a little shorter than wide, convex, the discal basal impression obsolete at about the middle of the length; abdomen much narrower than the elytra and equally long, the carinæ of the two basal tergites distinct. Length, 1.38 mm.; width, 0.45 mm. Pennsylvania (Westmoreland Co.), P. Jerome Schmitt.

The male in this unusually short, stout and convex species has two transverse carinæ on the median transverse line near the middle of the fourth ventral, the fifth with a median pyramidal tumor, the sixth broadly impressed medially, with two smaller rounded tubercles separated by about a fifth of the width of the segment, the large convex carinulate ventral pygidium as usual.

Euplectus, Leach.

The species of this genus are very distinct from the preceding in their flattened form and smaller approximate cephalic foveæ among other characters.

Euplectus Acomanus, n. sp.—Linear, depressed, dark blackish-piceous, the elytra more rufous; pubescence very short, not conspicuous though distinct, subdecumbent, the hairs directed obliquely inward posteriorly on the elytra; head large, transverse, basally truncate, the sides parallel, the eyes moderately small, but slightly prominent; foveæ separated by less than the distance of either from the eye; surface coarsely, densely punctate everywhere except in the moderate frontal depression, bounded by the short parallel sulci; antennæ one-half longer than the head; prothorax much narrower than the head, slightly wider than long, shining, minutely, sparsely punctate, the discal fovea large and elongate; elytra parallel, as long as the head and prothorax, and slightly wider than the former, decidedly longer than wide, the discal stria evident, extending slightly behind the middle; abdominal segments equal, not quite as wide as the elytra, the basal medial impressions subobsolete. Length, 1.3–1.4 mm.; width, 0.35 mm. New Mexico (Cloudcroft), Warren Knaus.

The male has a large, deep, rounded impression involving the median part of the sixth and anterior part of the seventh or large convex ventral pygidium, the latter with a double impressed longitudinal line.

Euplectus Duryi, n. sp.—Slender, less linear and depressed, shining, subimpunctate, piceo-testaceous, the pubescence moderate; head wider than long, moderately large, the eyes small, the tempora converging slightly to the truncate base; foveæ small, separated equally from each other and either eye; surface wholly impunctate along the middle from base to apex, the lateral parts coarsely but not very closely punctate; antennæ rather short; prothorax wider than long, evidently narrower than the head, prominently rounded laterally near the apex, the sides strongly converging and nearly straight thence to the base, the discal fovea rather small, only moderately elongate; elytra somewhat shorter than the head and prothorax, evidently though not greatly wider than the former, slightly elongate, the discal stria evanescent slightly before the middle; abdomen as long as the elytra and very nearly as wide, the two basal segments each with two rather long diverging basal carinæ medially. Length, 1.3 mm.; width, 0.28 mm. Ohio (Cincinnati), Charles Dury.

The male has a small median fovea at the apex of the sixth ventral, the large convex ventral pygidium eccentrically divided by a fine longitudinal carinule.

Leptoplectus, n. gen.

The minute and extremely slender linear species of this genus have the head large and well developed, with two rather approximate foveæ, more anterior in position than the large pubescent and very widely separated foveæ of *Pycnoplectus*, and resembling *Euplectus* in this feature as well as in the linear subdepressed form and general facies, but the eyes are far down on the sides of the head and the antennæ much more like those of *Trimium*, having the last joint relatively large, as in *Actium*, the ninth and tenth short, though not shorter than the preceding joints, and less transverse and lenticular than in the *Trimium* series. The four species in my cabinet are assignable to two groups, as follows :

Cephalic foveæ united by a broad, deep and continuous ambient sulcus, the frontal margin thick and convex 2

Cephalic foveæ large, though in the same position, elongate-oval, disconnected from the transverse frontal sulcus, the frontal margin acute and laminate 3

2. Body extremely slender, filiform, pale flavo-testaceous in colour, somewhat shining, the pubescence rather abundant and distinct but decumbent ; head subparallel, but little wider than long, punctured laterally ; prothorax as long as wide, narrower than the head, of the usual form in *Euplectus*, the surface finely, loosely punctate, more strongly basally ; transverse sulcus subobsolete ; elytra parallel, but little wider than the head, much longer than wide, the juxtahumeral impression obsolete at basal fourth ; abdomen parallel, almost as wide and fully as long as the elytra. Length, 0.85 mm.; width, 0.2 mm. (♀). District of Columbia and Pennsylvania (Westmoreland Co.)............................*pertenuis*, Csy.

Body slender, linear and subdepressed but broader and perceptibly larger than in *pertenuis*, pale testaceous, rather inconspicuously pubescent ; head but slightly wider than long, parallel and straight at the sides, broadly sinuate at base, the eyes at more than their own length from the rounded basal angles ; surface moderately convex, polished, the two small deep perforate and nude foveæ mutually separated by a little less than either from the eye, the ambient sulcus shallower that in *pertenuis ;* surface sparsely but coarsely, not very deeply punctate laterally ; tenth antennal joint fully three times as wide as long, the eleventh rather longer than the four preceding combined ; prothorax about as long as wide, narrower than the head, more broadly rounded at the sides anteriorly than in *pertenuis*, polished, sparsely, subasperately punctate, the foveæ large as usual, the transverse sulcus barely traceable; elytra slightly shorter than the head and prothorax, but little wider than the former, slightly though very obviously longer than wide, parallel, the impression extending through basal third; abdomen as in *pertenuis*. *Male* with two small rounded and projecting median lobes and three sinuses at the apex of the fourth ventral, the fifth with a small tubercle opposite each of the lateral sinuses, and a small setigerous tubercle opposite the median and rather deepest sinus; sixth segment broadly and strongly concave almost throughout its width, the seventh convex and longitudinally carinulate; median trochanters with a small posterior tooth. Length, 1.0 mm.; width, 0.25 mm. (♂, ♀). Pennsylvania (Westmoreland Co.), Schmitt, and Ohio (Cincinnati), Dury. . . *filiformis*, n. sp.

3. Form rather stouter and less parallel than in the preceding species, shining, dark testaceous, the elytra infuscate; pubescence rather inconspicuous; head but little wider than long, the sides feebly converging basally, the eyes at much more than their own length from the base, the latter broadly sinuate; occiput with a fine axial impression as usual; surface finely, sparsely and equally punctate throughout; foveæ large, elongate, deep, mutually separated rather more than either from the eye, their posterior part pubescent; transverse frontal pit deep, polished and impunctate; antennæ as in *filiformis;* prothorax as long as wide, narrower than the head, minutely, equally punctate like the latter, the foveæ nearly similar; transverse sulcus similarly obsolete; converging sides each with a very small tooth at the fovea, not distinctly observable in *filiformis*, though slightly evident in *pertenuis;* elytra obviously shorter than the head and prothorax, distinctly wider than the former, parallel, with feebly arcuate sides, evidently longer than wide, the deep impression obsolete at basal third; abdomen parallel, much narrower than the elytra and not quite so long, the segments equal as usual, the two basal feebly impressed medially at base. *Male* with much feebler sexual characters, the fourth ventral unmodified, the fifth very short medially and scarcely half as long as the fourth, not modified except perhaps a very small feeble median tubercle; sixth as long as the fourth, broadly, subangularly emarginate throughout the width, its surface flattened medially; seventh not convex, but flat or feebly, unevenly impressed transversely, longitudinally carinulate, broadly angular anteriorly, broadly rounded throughout the width at apex. Length, 0.9 mm.; width, 0.25 mm. (♂). Pennsylvania (Westmoreland Co.), Schmitt. . . . . *insolens*, n. sp.

Form more slender, very much smaller in size, linear, testaceous throughout; head scarcely wider than long, formed nearly as in *insolens*, finely, sparsely perferato-punctate but more remotely so medially; foveæ large, separated distinctly more than either from the eye, the frontal sulcus and its laminate anterior wall similar; prothorax nearly similar in form and finely, sparsely, uniformly perferato-punctate, with the lateral teeth small but distinct, very much smaller than the head, the foveæ all smaller and more feeble than in any other species; elytra shining and very minutely, sparsely punctulate as usual, subelongate, distinctly wider than the head, parallel, with feebly arcuate sides, the impression obsolete at basal third; abdomen nearly as in *insolens*. *Male* apparently with simple characters, the seventh ventral as in *insolens* but more narrowly and parabolically rounded behind; last dorsal rather tumid or strongly, longitudinally convex along a transverse subapical line. Length, 0.8 mm.; width, 0.2 mm. (♂). Ohio (Cincinnati), Dury..........
exilissimus, n. sp.

My only example of *exilissimus* is in a very fragmentary condition, so that it is difficult to even measure it, and the male sexual characters are for the most part concealed by the mounting; it is one of the frailest and most minute of the entire Pselaphidæ. In glancing over the Pselaphidæ of my collection, it may be casually observed that the smallest and most slender species are *Thesiastes atratus*, *Bibloplectus ruficeps* and *Dalmosella tenuis*, which are certainly to be numbered among the more wonderful of the inhabitants of this planet.

Actium, Csy.

The following species of this genus may be advantageously described at the present opportunity:

Actium bicolor, n. sp.—Stout, convex, polished, subimpunctate, the pubescence fine and inconspicuous, testaceous, the elytra brighter though clouded at base and apex, the head and abdomen black; head of the usual form, the two pubescent foveæ separated by nearly half the entire width, the ambient sulcus very feeble; antennæ moderate, joints seven to ten gradually wider, the latter nearly four times as wide as long, the eleventh as long as the preceding five, elongate-ovoidal; prothorax slightly wider than long and distinctly wider than the head, impunctate, broadly rounded at the sides anteriorly, moderately narrowed toward base, with the usual two basal foveæ connected by the posteriorly cuspid transverse sulcus; elytra scarcely as long as wide, almost twice as wide as the prothorax, the sides rounded, the humeri distinct, the sulcus obsolete at or a little before the middle; surface punctured apically, the basal foveæ three in number; abdomen distinctly narrower than the elytra and not quite as long, very declivous posteriorly as usual, the basal segment with two slender parallel carinæ separated by almost half the total width and extending somewhat beyond the middle of the segment, the second segment with two similar though slightly smaller carinæ. *Male* with the fourth segment extremely short at the middle, the fifth short even at the sides, disappearing at the middle, the sixth very large, punctulate, broadly flattened or feebly concave toward the middle, the operculum of the seventh segment densely punctulate, small, transversely oval and eccentric. Length, 1.25 mm; width, 0.46 mm. New Mexico (Cloudcroft), Warren Knaus.

This species somewhat resembles *politum* of the Pacific coast fauna but is smaller; it may be recognized at once by its peculiar coloration.

Actium retractum, n. sp.—Smaller and much more slender and depressed, polished, pale testaceous throughout, subimpunctate, the pubescence inconspicuous; head well developed for this genus, though distinctly narrower than the prothorax, the widely-distant foveæ united by a feeble ambient sulcus; antennæ more slender though similar, the tenth joint not quite so transverse, the eleventh more slender, conoidal, as long as the five preceding; prothorax relatively large, distinctly wider than long, more strongly narrowed basally, the foveæ and transverse sulcus as usual; elytra evidently though not greatly shorter than wide, scarcely one-half wider than the prothorax, the sides arcuate, the humeri evenly rounding, the sulcus traceable to the middle, the basal foveæ three in number; abdomen as long as the elytra and nearly as wide, less declivous posteriorly than in the preceding, the first dorsal with two very short carinules separated by less than a third the total width, the second without visible carinules. *Male* with the first three ventral sutures straight from side to side, the others strongly sinuate, the fifth segment short at the middle, the sixth large and punctulate but scarcely more than flattened medially; the nearly flat operculum of the seventh is very large, sparsely punctulate, slightly wider than long. Length, 1.2 mm.; width, 0.33 mm. ♂, ♀). Queen Charlotte Islands, J. H. Keen.

Allied to the *candidum*, *marinicum*, *pacificum* group of the genus, much more parallel in form and smaller than the typical species.

Actium blandum, n. sp.—Form stout and convex, with the hind body inflated as in *politum* and other normal west coast forms, shining, subimpunctate, moderately pubescent, very pale flavo-testaceous throughout; head small, with rather large prominent eyes, nearly as in *bicolor* throughout, except that the tenth antennal joint is much less transverse, not quite three times as wide as long; prothorax as long as wide, much wider than the head, prominently subangulate at the sides near the middle, the sides subsinuately converging thence to the base, the lateral foveæ nude, each with a short stiff seta; elytra nearly as long as wide, four-fifths wider than the prothorax, the sides arcuate, the humeri obtusely angulate and distinct, the sulcus traceable not quite to the middle, the basal foveæ two in number; abdomen narrower and much shorter than the elytra, the first dorsal with two parallel carinæ in nearly basal half and separated by about a fourth the entire width, the second dorsal without visible carinæ. *Male* with ventrals two to five gradually shorter along the median line, the sutures becoming more sinuate, the sixth segment longer, lunate, scarcely modified, the flat operculum of the seventh very large, subimpunctate, elliptical and slightly elongate, central and not at all eccentric. Length, 1.25 mm.; width, 0.48 mm. Pennsylvania (Westmoreland Co.), Schmitt.

This species approaches the west coast forms in outline more closely than any other eastern species that I have seen; it differs, nevertheless, very greatly in male sexual characters from such types as *bicolor*. The *Trimium durum*, of Brendel, is omitted altogether by Raffray; it seems to be an *Actium*, but is unknown to me.

Pseudactium, n. gen.

A special genus seems to be necessary for certain species resembling *Actium* in general organization, but of more parallel form, much larger head and distinctly different antennæ, the latter having the club more Euplectiform, as shown by Brendel in the case of a typical species (Tr. Am. Ent. Soc., 1893, pl. IV, fig. 7). The acute side margins of the prothorax, large pubescent discal foveæ connected by a transverse biarcuate groove and subhumeral pubescent fovea with attendant longitudinal pleural sulcus, and equal abdominal segments, are as in *Actium*. The three species known to me may be described as follows, the first being the type:

Pseudactium Carolinæ, n. sp.—Form slender, moderately convex, polished, subimpunctate, rather sparsely and inconspicuously pubescent, dark testaceous; head wider than long, with two pubescent foveæ separated by half the entire width and connected by a simple parabolic sulcus, the eyes rather small, the tempora converging slightly; antennæ one-half longer than the head, rather slender, the three joints of the club gradually wider, ninth and tenth between two and three times as wide as long, symmetric, the eleventh obtusely ogival apically, as long as the preceding three; prothorax equal in width to the head, a little wider than long, the sides strongly rounded anteriorly, converging and nearly straight from somewhat before the middle to the base, the pubescent foveæ and connecting biarcuate sulcus deep; elytra slightly shorter than wide, moderately inflated distally, not quite one-half wider than the prothorax, the sides rounded; humeri narrowly exposed, distinct; sulcus obsolete somewhat behind the middle, the base with a very minute and feeble intermediate fovea; abdomen slightly narrower and a little longer than the elytra, parallel, the first dorsal with a transverse nude basal impression in median third but not carinate. Length, 1.15 mm.; width, 0.28 mm. North Carolina, Schmitt.

A single female. The erect minutely capitate setæ of the under surface of the head are present anteriorly and very fine, though long, their terminal knobs subspherical.

Pseudactium mellinum, n. sp.—Form shorter and thicker, convex, polished, similarly subimpunctate, pale flavo-testaceous throughout, the pubescence inconspicuous; head nearly similar, the eyes notably larger and more convex, the last antennal joint relatively more elongate, about as long as the preceding four combined; prothorax equal in width to the head, nearly as in *Carolinæ;* elytra very much larger, as long as wide and as long as the head and prothorax, fully three-fifths wider, the median basal fovea stronger, the sides rounded; discal stria extending well behind the middle; abdomen narrower than the elytra and much shorter, the basal impression of *Carolinæ* obsolete or very nearly. *Male* with the first four ventral sutures nearly straight and transverse, the fifth strongly sinuate, the fifth segment long at the sides, very short medially; sixth large, broadly impressed medially, deeply sinuate behind for the rather large and obliquely oval flat operculum, which occupies nearly all the seventh segment and slightly longer than wide, minutely, sparsely punctulate and shining. Length, 1.1 mm.; width, 0.4 mm. Pennsylvania (Westmoreland Co.), Schmitt.

Differs profoundly from the preceding species in its more obese form, greater convexity and very much more developed elytra.

Pseudactium cephalicum, n. sp.--Form narrower, more depressed and parallel, shining, subimpunctate, dark testaceous, the pubescence much longer and more conspicuous than in either of the preceding; head nearly as in the preceding, larger, wider than long, the eyes rather small, convex, the tempora somewhat strongly converging; antennæ with the last joint but little longer than the preceding three, rather acutely pointed; prothorax evidently narrower than the head, wider than long, constituted as in the preceding; elytra more nearly as in *Carolinæ*, much shorter than wide, barely one-half wider than the prothorax, rounded and basally narrowed at the sides, the dorsal stria unusually developed, obsolete at apical third; abdomen slightly narrower and evidently longer than the elytra, the basal impression of the first dorsal very feeble. Length, 1.35 mm.; width, 0 38 mm. Pennsylvania (Westmoreland Co.), Schmitt.

This species is represented by the female alone and is more closely allied to *Carolinæ* than to *mellinum*, but differs from both in its much longer pubescence and more elongate discal stria of the elytra. The species described by Brendel under the name *Trimioplectus ? parabolicus*, is evidently a member of this genus, but differs, among other features, in its very abbreviated elytral stria or sulcus, which is said to extend only a fifth from the base. The locality was not mentioned by the describer, but the type was probably found in Iowa.

Oropus, Csy.

This is probably the largest genus of peculiarly Pacific coast Pselaphidæ, and numerous species have come to light since my last revision. They are rather closely allied among themselves, but may be assigned to three easily-recognized divisions, as follows :

Basal segment of the dorsum but little longer than the second 2
Basal segment much elongated, constituting nearly half the abdomen as viewed from above . . . . (Group III) 12
2. Larger, stouter and more convex species, the elytra about as long as wide . . . . (Group I) 3
Smaller, more slender and more depressed species, the elytra always distinctly shorter than wide, with the rounded sides more diverging from the base . . . . (Group II) 9
3. Head large, about as wide as the prothorax 4
Head smaller, always distinctly narrower than the prothorax 6

4. Antennæ shorter and thicker, a little shorter than the head and prothorax; pronotal sulcus sometimes interrupted behind the middle. California (Fisk's Mill, Sonoma Co.) ....*interruptus*, Csy.

Antennæ more slender, fully as long as the head and prothorax or a little longer; body less stout............................5

5. Ninth and tenth antennal joints but slightly transverse, less than one-half wider than long; lateral teeth of the prothorax very feeble, in the form of feeble rounded swellings of the edge. *Male* with the fourth dorsal feebly, transversely impressed at base, the polished impression with a fine feebly-chagrined line along the bottom in median third. California (Sonoma Co.)..........................*convexus*, Csy.

Ninth and tenth antennal joints much more transverse, one-half to two-thirds wider than long; lateral teeth of the prothorax prominent and very acute; body a little smaller and narrower, though even more convex, polished, dark testaceous, the pubescence rather sparse, moderately distinct; integuments very finely, sparsely punctate, the elytra more coarsely and rugulosely so, though not densely; impression at the base of the first dorsal deep and large, one-half the discal width. *Male* with the fourth dorsal wholly impunctate, more broadly, feebly and indefinitely impressed transversely in nearly basal half, the sparsely and feebly chagrined line broader and more indefinite. Length, 1.6 mm.; width, 0.6 mm. California (Marin, Alameda and Sta. Cruz Co's.).................... *testaceus*, n. sp.

6. Male with a large, broadly concave and more indefinitely bounded transverse impression in about basal half of the fourth dorsal 7

Male with a short, deeper and more abruptly defined transverse impression at the base of the fourth dorsal 8

7. Form stout, convex, dark castaneo-testaceous, polished, the pubescence moderately long, reclined, distinct though not dense; head thick, subtriangular, the eyes well developed, the ambient sulcus deep as usual, the antennæ notably stout apically, the penultimate joints distinctly transverse; prothorax not very greatly though evidently wider than the head, not quite as long as wide, angularly rounded and prominent at the sides before the middle, the lateral teeth small but evident; discal foveæ and sulci as usual; elytra convex, about as long as the head and prothorax, three-fourths or more wider than the latter, the sides rounded, the elongate humeral callus very pronounced;

third discal stria extending nearly to apical fourth; abdomen slightly shorter than the elytra and not quite as wide, the first dorsal impressed and puberulent at base; ventral sexual characters of the male simple, the sixth segment feebly tumid laterally. Length, 2.0 mm.; width, 0.8 mm. British Columbia (Metlakatla), J. H. Keen, and Vancouver Island.............................*Keeni*, n. sp.

8. Larger species, some 2 mm. in length, the head unusually small, very much narrower than the prothorax; basal impression of the abdomen wider, about half the total width. Vancouver Island..*striatus*, Lec.

Smaller species, the head larger, though evidently narrower than the prothorax; basal impression of the abdomen narrower, evidently less than one-half the total width, and more strongly bilobed. California (Humboldt to Sonoma)..............*abbreviatus*, Csy.

9. Antennal club very stout, the two penultimate joints strongly transverse..10

Antennal club more slender, the penultimate joints very moderately transverse..11

10. Species of the Sierras, the head small, very much narrower than the prothorax; second elytral stria broadly amalgamating with the sutural stria near apical third. California (Placer Co.).....*montanus*, Csy.

Species of the northern coast regions, larger in size, the second stria free throughout; head moderately small though very obviously narrower than the prothorax, the eyes moderate, though a little more prominent, evenly castaneo testaceous, polished, moderately convex, the pubescence rather sparse and inconspicuous; prothorax a little wider than long, of the usual form, finely, sparsely perforato-punctate, the lateral teeth small and rather obtuse; elytra more strongly, though sparsely and more rugusely punctate; elytra transverse, one-half longer and wider than the prothorax, the sides strongly diverging and broadly arcuate from base to apex, the elongate humeral callus strong; abdomen with unusually arcuate sides, as wide as the elytra and much longer, the basal impression nearly one-half the total width. Length, 2.0 mm.; width, 0.72 mm. British Columbia (Metlakatla), Keen...........*brevipennis*, n. sp.

11. Last two joints of the antennal funicle shorter than the preceding, though scarcely at all broader, strongly transverse, the club about as long as the preceding six joints combined, with unusually little

difference in size and form between its first two joints, both fully twice as wide as long, the last joint gradually pointed, but little wider than the tenth and as long as the four preceding combined; body dark testaceous, polished, the head nearly as wide as the prothorax, the lateral teeth of the latter strong, broadly angulate; elytra and abdomen nearly as in *brevipennis*. Length, 1.7 mm; width, 0.63 mm. California (Humboldt Co.)..............*curtipennis*, n. sp.

Last two joints of the antennal funicle not materially shorter or more transverse than the preceding; antennal club relatively still more slender but with the joints rather more rapidly increasing in size, the ninth and tenth differing more markedly in size and not so transverse; body nearly similar, though darker in colour, the elytra sometimes brighter and rufescent, the lustre shining; punctuation rather more evident; head a little smaller, more distinctly narrower than the prothorax; hind body similar though very slightly less inflated, the entire outline rather more slender than in *curtipennis*. Length, 1.7 mm.; width, 0.6 mm. California (San Francisco and Marin Co's.)................................*castaneus*, n. sp.

12. Elytra evidently shorter than wide 13

Elytra as long as wide; form slender 14

13. Moderately stout, rather convex, shining, dark testaceous, the pubescence rather long and distinct; head of the usual form and structure, the antennæ stout apically, the ninth and tenth joints twice as wide as long, the last stout and rather longer than the preceding three; prothorax slightly wider than the head, of the usual form and sculpture, the punctures strong and evident, though not dense; lateral teeth small but distinct and spiniform; elytra with rounded sides, which are more converging and rounded basally, the humeral callus moderate; striæ as usual; surface minutely, sparsely punctulate; abdomen not quite as long or wide as the elytra, the basal impression wider than usual, more than half the total width. *Male* with the fourth dorsal broadly concave, impunctate and glabrous, the surface gradually curved posteriorly above and subacute, so that its reverse side appears from above as a pronounced tooth behind the broadly and feebly parabolic hind margin of the third segment, which is herissate with longer dense hairs, the acute upper tip of the fourth is also tufted with very short fine and dense hairs. Length, 1.7 mm.; width, 0.63 mm. California (Sta. Cruz Co.).........*basalis*, n. sp.

Form less stout, smaller in size, moderately convex, shining, testaceous, the pubescence rather more herissate and evident; head more transverse, with slightly smaller foveæ; antennæ nearly similar, the penultimate joints slightly more transverse; prothorax somewhat wider than the head, of the usual form and with the usual sulci and foveæ, but having the sculpture between the transverse groove and base granulose and not rather coarsely and simply punctate as in *basalis*, the lateral teeth smaller and more angular; elytra nearly as in *basalis*, but with less evident humeri, the abdomen almost similar, rather shorter than the elytra and virtually as wide. *Male* with nearly similar sexual characters. In the original description the posterior abdominal tooth was erroneously described as pertaining to the tip of the third segment. California (Marin Co.). . *cavicauda*, Csy.

14. Form slender, moderately convex, testaceous, distinctly and coarsely though sparsely pubescent; head and antennæ nearly as in *cavicauda*, the former with very small sparse granules, the antennæ about as long as the head and prothorax, the latter slightly wider than the head, very nearly as long as wide, having the usual sulci and foveæ, the surface finely, sparsely, subasperately punctulate, the area between transverse groove and base finely and sparsely granose; lateral teeth extremely feeble and obtuse; elytra as long as the head and prothorax, the humeri distinct, the sides broadly arcuate, the striæ as usual; abdomen evidently shorter than the elytra, though about as wide, the basal segment long but very evidently less than half the length from above. Length, 1.4 mm.; width, 0.48 mm. California (Siskiyou Co.). . . . . *debilis*, n. sp.

The last species is founded upon a specimen formerly placed with *cavicauda* (Ann. N. Y. Acad., VII, 1893, p. 448); it is assumed to be a female, but differs from the female of *basalis*, which has the fourth dorsal feebly convex and similar to the others, in having that segment broadly flattened or feebly concave. It is evidently a distinct species.

The third group, comprising the last three species of the table, has very much more accentuated male sexual characters than the others, and the more elongate first dorsal gives its species a peculiar appearance; they are the smallest of the genus, but otherwise there is no difference of a generic nature; the relative size of the basal segment therefore appears to be of very much less significance here than among the allies of *Trimium*.

Individuals of the two sexes are very unequally represented in the various groups, for, in the first group, out of seventeen examples before me there seems to be only one male, and in the second, having abbreviated elytra, out of twelve examples there is but one female ; in the third group, among five examples, three are males and two females. There is little or no sexual difference in structure, size or general appearance.

Rhexius, Lec.

This genus, composed of smaller and more slender species, replaces *Oropus* in the Atlantic regions of America, and has very much the same general facies, differing profoundly, however, in the constricted and greatly narrowed apex of the prothorax, elongate basal antennal joint and general absence of discal elytral striæ. The single lateral and subposterior thoracic tooth of *Oropus* is replaced by three minute and equidistant denticles along the arcuate part of each side. The sexual characters are even feebler than in *Oropus*, there being no dorsal modifications, and the last ventral is merely larger and more apically impressed in the male; there is no sexual difference at all in bodily form or habitus. The species are similarly closely allied among themselves, necessitating careful observation ; those in my collection may be defined as follows :

Body with longer, erect and more conspicuous pubescence 2

Body with shorter, sparser and less bristling pubescence..............3

2. Form rather convex, shining, subimpunctate, testaceous ; head transverse, the eyes moderate, the tempora long and only just visibly converging, the base broadly sinuate, the occiput impressed, with a long carinule extending to before the middle, the large perforate nude foveæ widely separated, before the middle, not connected with the strong, broad, transverse sulcus behind the apical margin, the later being thin and acute ; basal joint of the antennæ very thin, as long as the following six joints, the club as long as the funicle, with the eleventh joint as long as the preceding three ; prothorax transverse, as wide as the head, the part behind the apical stricture three-fourths wider than long, the surface convex, the three basal pits as usual, not connected by a transverse sulcus, the median sulcus strong, linear and, as usual, extending onto the apical lobe ; elytra slightly abbreviated, as long as the head and prothorax and one-half wider, the sides rounded, the humeri distinct, the juxta-humeral impression large and strong,

the four perforate basal foveæ well developed; sutural stria fine, the others obsolete; abdomen about as long and wide as the elytra, the basal segment slightly longer than the second, with a basal impression in fully median half. Length, 1.4 mm.; width, 0.5 mm. Mississippi (Vicksburg), [New Orleans,—Leconte]. .*insculptus*, Lec.

Form similar but much smaller in size, the head similar, except that the foveæ are smaller and feebler and the anterior pit small, feebler and transversely oval, the frontal edge not fine and acute, but low and broadly convex as usual; occipital carina finer and shorter, the antennæ nearly similar; prothorax smaller and less transverse, very distinctly narrower than the head; elytra more distinctly shorter than wide, not as long as the head and prothorax, and only a third wider than the former, otherwise similar, the median discal impression, in neither case striiform, extending rather further from the base; abdomen about as wide as the elytra and very evidently longer. Length, 1.25 mm.; width, 0.42 mm. Missouri (St. Louis).
hirsutus, n. sp.

3. Prothorax small, much narrower than the head 4

Prothorax larger, subequal in width to the head 6

4. Head larger, moderately transverse, the eyes small, at about twice their own length from the base, the first antennal joint thicker, as long as the next six, as wide as the second and fully half as wide as the eleventh, its upper surface punctato-rugulose and hairy, the long erect hairs of its under surface conspicuous; frontal pit small, transverse, the depressed frontal margin thick and convex, granulose; surface strongly granose laterally; prothorax distinctly transverse, smooth, convex and polished, tumid and strongly granose basally, also in and near the anterior stricture, having the usual sulci and disconnected basal foveæ; elytra distinctly shorter than wide, much shorter than the head and prothorax, scarcely a third wider than the head, the sides diverging and arcuate, the humeri feeble, the discal impression short and broad, not quite extending to basal third, the surface minutely, sparsely asperulato-punctate; abdomen fully as wide as the elytra and evidently longer, the basal impression in median half abruptly and obliquely limited at the sides. Length, 1.3 mm.; width, 0.5 mm. District of Columbia .... *ruber*, n. sp.

Head relatively smaller, the front similar, the basal antennal joint much more slender, not quite as wide as the second and less than half as thick as the eleventh, its upper surface smooth and almost glabrous; eyes larger.................................... 5

5. Head almost twice as wide as long, the eyes unusually large, convex and prominent, at barely their own length from the base; surface smooth and polished medially, finely, sparsely granose laterally; prothorax nearly as in *ruber*, but more finely and sparsely granose basally and apically; elytra larger, not quite so abbreviated, shining, the discal impression strong and broad basally, but with its internal part prolonged posteriorly, becoming obsolete only behind the middle; abdomen about as long as the elytra and nearly as wide, rounded at the sides, the basal impression almost similar. *Male* with the last ventral large, nearly as long medially as the three preceding combined, gradually strongly and broadly impressed toward apex, the hind margin thin and sublaminate. Length, 1.5 mm.; width, 0.52 mm. Pennsylvania (Westmoreland Co.), P. Jerome Schmitt.

ferrugineus, n. sp.

Head evidently not twice as wide as long, the eyes well developed, but less prominent, and at rather more than their own length from the base; body much smaller in size and more yellowish in colour; prothorax nearly as in *ferrugineus*, but more convex and with a less evident sinus at each side near the base; elytra smaller and rather more abbreviated, about as long as the head and prothorax, and fully a third wider than the former, impressed nearly as in the preceding, except that the median groove extends only to the middle; abdomen fully as wide as the elytra but not quite so long, the basal impression not quite so extended transversely as in *ferrugineus*. *Male* with the last ventral very much shorter and more transverse, with a rather smaller and more definite transversely oval apical impression. Length, 1.3 mm.; width, 0.42 mm. Pennsylvania (Westmoreland Co.), Schmitt.................... *Schmitti*, Brend.

6. Form rather stout, convex, shining, testaceous; head well developed, thick, convex, transverse, deeply sinuate at base as usual, granulose except between the three foveæ, the apical transversely oval and deep, the frontal margin thick, depressed; eyes moderately small, prominent, at a little more than their own length from the base; first antennal joint as long as the funicle, rather thicker

than usual, more than half as thick as the eleventh, finely punctato-rugose, and with bristling pubescence; prothorax with the usual sulci and foveæ, moderately transverse, only slightly narrower than the head, very sparsely granose at base; elytra but little shorter than wide, fully as long as the head and prothorax and nearly one-half wider, the humeri pronounced, the discal lines rather distinct, the second extending to slightly before, the third to slightly behind, the middle; abdomen about as long and wide as the elytra, the basal impression nearly half the total width, limited abruptly by oblique lines at the sides. Length, 1.5 mm.; width, 0.54 mm. Virginia (Norfolk)...................................*virginicus*, n. sp.

Form, colour and general characters nearly as in the preceding, but with the basal joint of the antennæ sensibly more slender in the male, as compared with the male of *virginicus;* general form a little stouter throughout, the prothorax decidedly shorter and more transverse, scarcely visibly narrower than the head; elytra broader, much more evidently shorter than wide, the second impression very short, basal, the juxta-humeral impression large and deep, rapidly becoming very faint and narrow, and barely traceable to the middle; abdomen nearly similar. Length, 1.5 mm.; width, 0.58 mm. Cab. Levette, probably from Indiana........................*transversus*, n. sp.

The last two species, and particularly *virginicus*, are probably more especially allied to *substriatus*, Lec., founded upon a unique from Tampa, Fla., which I have not seen; it is said to be larger, darker and less convex than *insculptus*, the eyes small, the elytra each with four faint striæ, of which the subhumeral is longer and more distinct, the others extending only to about the middle; the antennæ have the ninth and tenth joints less abruptly larger than in *insculptus*. The length is 1.5 mm.

Mr. Keen has recently sent me a specimen of *Megarafonus ventralis*, from Metlakatla, British Columbia, showing that its range is somewhat extended.

A NEW GENUS OF BYRRHIDÆ.

BY THOS. L. CASEY, WASHINGTON, D. C.

The following is one of the more interesting of the many recent discoveries of Mr. J. H. Keen, and I have taken advantage of the present opportunity to suggest for it a probable systematic position in the Byrrhid series:

Exoma, n. gen.

Body small, oval, very convex, the elytral striæ so deeply impressed as to form coarse sulci; head deflexed, deeply inserted, subquadrate, the arcuate frontal margin reflexed, the clypeus short, broadly arcuate; labrum large, transverse, sinuate, vertically inflexed under the clypeus; maxillary palpi slender, the last joint oval, acuminate; eyes basal, flattened, transversely oval, with convex separated facets; the antennæ are 11-jointed, inserted in small ante-ocular excavations, slender but short, the basal joint thicker, oval, the last three larger, gradually increasing and forming a loose club; prosternum broadly lobed anteriorly, flattened and produced between the coxæ, its sinuato-truncate apex received within a mesosternal pit between the middle coxæ; metasternum ample, the episterna narrow and completely fused; abdomen with five free segments, much above the plane of the metasternum; epipleuræ broad, parallel and horizontal to the end of the metasternum, being there abruptly broken, ascending and thence much narrowed posteriorly, disappearing before the apex; the posterior wall of the metasternum and epipleura forms a shelter for the hind thighs; legs short, the two anterior free though retractile; tarsi well developed, 5-jointed, coarsely hairy, the first and fifth joints of the posterior elongate, the three intermediate shorter.

The peculiar epipleural structure and the sulcate elytra constitute of this genus such a marked exception that it is impossible to associate it with any thus far known; its divergencies are apparently tribal or subtribal in nature. The type is the following:

E. pleuralis, n. sp.—Deep black, shining, the upper surface with short, erect, curved setæ, very easily removed and forming a single series on each of the convex elytral intervals, more persistent on the head and pronotum, which are frequently covered with concealing foreign matter; head finely, sparsely punctulate, the erect setæ very small and inconspicuous; prothorax transverse, at base as wide as the elytra, narrowed anteriorly, the surface with very minute and remote asperulate punctulation bearing the stronger curved setæ; elytra barely as long as wide, inflated basally and widest at about basal third, rapidly narrowed thence to the narrowly-rounded apex. Length, 1.5–1.6 mm.; width, 0.9–1.0 mm. British Columbia (Metlakatla).

This genus will be considered again in a general revision of the American Byrrhidæ which the author has in contemplation, and he takes this occasion to say that material of any kind in this family, from any part of the continent, would be most welcome.

A SECONDARY SEXUAL CHARACTER OF APHIDIDÆ.

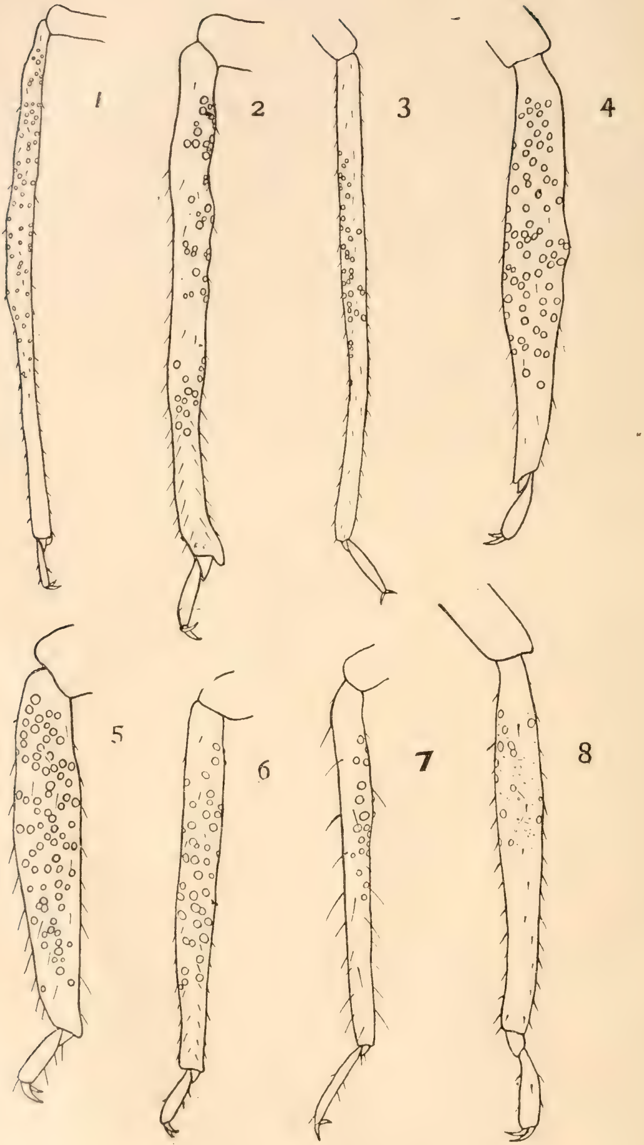
BY JOHN J. DAVIS,

Office of the State Entomologist, Urbana, Illinois.

A character of the oviparous females of Aphids which has been previously mentioned in descriptions, but which, so far as I can learn, has never been treated as a secondary sexual character, is the presence of sensoria upon the hind tibiæ, in consequence of which the hind tibiæ are usually noticeably swollen. The term "sensoria," in Aphid descriptions, was first used by Professor O. W. Oestlund, in his "Synopsis of the Aphididæ of Minnesota" (1887), in referring to the pores on the antennæ.

Buckton, in his "Monograph of the British Aphides," Vol. I (1875), p. 104, probably referred to these sensorial pores when he wrote, in his description of the apterous oviparous female of *Siphonophora rosæ*, Reaum., that "the hind tibiæ are furnished with numerous tubercular spots, which probably assist the insect in arranging the soft and glutinous eggs in the recesses of the leaf buds." Also in Volumes I and II of this same work he mentions, in the descriptions of the apterous oviparous females of *Siphonophora dirhoda*, Walk.; *Aphis edentula*, Buck.; *A. pruni*, Reaum.; *A. viburni*, Schr.; *A. sambucaria*, Pass., and *Chaitophorus betulæ* (?), Buck., that the hind tibiæ are flattened, expanded or dilated.

These so-called pores or tubercular spots on the hind tibiæ were first referred to as sensoria by Dr. S. A. Forbes, who, in the Eighteenth Report of the State Entomologist of Illinois (1894), mentions and figures them as being conspicuously present on the hind tibiæ of the apterous oviparous females of *Aphis maidi-radicis*, Forbes. Since then, mention of these tibial sensoria as occurring on the sexual females of *Siphocoryne avenæ*, Fabr., and *Hormaphis hamamelidis*, Fitch, has been made by Mr. Theo. Pergande in Bulletin 44 (1904) and in Technical Bulletin 9 (1901) of the U. S. Bureau of Entomology; by Professor E. Dwight Sanderson, who refers to them as "pores" in his descriptions of the apterous oviparous females of *Aphis pomi*, De G.; *A. sorbi*, Kalt., and *A. brevis*, Sand. (he also shows these "pores" in his figure of *Aphis Fitchii* = *Siphocoryne avenæ*, but makes no mention of them in his description), in the Thirteenth Annual Report of the Agricultural Experiment Station of Delaware (1892), and in *Entomological News* (1906), in his description of the apterous oviparous females of *Macrosiphum granaria*, Buck., he says: "meta-tibiæ with numerous pores"; by Miss Edith M. Patch, who, in Bulletin 147 of the Maine Agricultural Experiment Station (1907), mentions and figures the sensoria on the hind tibiæ of *Macrosiphum solanifolii*, Ashm.; and by Professor F. L. Washburn, in CANADIAN ENTOMOLOGIST (1908), who found them present on the hind tibiæ of the apterous oviparous females of *Toxoptera graminum*, Rond.



SENSORIA ON HIND TIBIAE OF APHIDIDAE.

In a recent letter from Professor C. P. Gillette, he writes that he has examined a few species, contained in the collection of the State Agricultural College of Colorado, namely : *Brachycolus Ballii*, Gill.; *Callipterus* sp., *C. discolor*, Mon.; *Drepanosiphum Braggii*, Gill.; *D. acerifolii*, Thos., and *Chaitophorus nigræ*, Oest., and all bore sensoria on the hind tibiæ of the sexual females, they being rather obscure in the species of *Callipterus* and *Brachycolus*.

I have found these tibial sensoria on the oviparous females of *Sipha flava*, Forbes ; *Callipterus trifolii*, Mon.; *Aphis brevis*, Sand.; *A. maidi-radicis*, Forbes ; *A. Folsomii*, Davis ; *Myzus elæagni* (?), Del Guer.; *Macrosiphum liriodendri*, Mon.; *Rhopalosiphum berberidis*, Kalt., and *Drepanosiphum acerifolii*, Thos.

Thus we find that these sexual tibial sensoria have been found present on species representing twelve different genera, namely : *Macrosiphum*, *Myzus*, *Rhopalosiphum*, *Drepanosiphum*, *Aphis*, *Sipha*, *Siphocoryne*, *Chaitophorus*, *Callipterus*, *Toxoptera*, *Brachycolus*, and *Hormaphis*.

I have examined many species for these tibial sensoria, and have never found them present on the hind tibiæ of viviparous females or males, but have always found them present on oviparous females. Although a positive statement can not now be made with our present knowledge, still it is quite probable that the hind tibiæ of the oviparous females of the *Aphididæ*, or at least of the subfamilies *Pemphiginæ*, *Schizoneurinæ*, *Lachninæ*, and *Aphidinæ*, are usually noticeably swollen, and always bear more or less distinct and numerous sensoria. I know of no other definite character for the distinguishing of the viviparous and oviparous females, excepting the presence of either embryos or eggs in the body. Mention has been made by several authors that the oviparous females of certain species hold their bodies vertical to the surface upon which they are resting. I have observed this characteristic position as common to the sexual females, especially with *Sipha flava* and *Aphis maidi-radicis*, but I find that it is not constant with all species, nor is it always the case with the two species above mentioned.

EXPLANATION OF PLATE 8.

Hind tibiæ of oviparous females of (1) *Macrosiphum liriodendri*, Mon.; (2) *Aphis Folsomii*, Davis ; (3) *Drepanosiphum acerifolii*, Thos.; (4) *Rhopalosiphum berberidis*, Kalt.; (5) *Aphis maidi-radicis*, Forbes ; (6) *Myzus elæagni* (?), Del Guer.; (7) *Sipha flava*, Forbes ; and (8) *Callipterus trifolii*, Mon.

NOTES ON THE SPECIES OF RHYNCHAGROTIS, SM., WITH DESCRIPTIONS OF NEW SPECIES.

BY JOHN B. SMITH, SC.D., NEW BRUNSWICK, N. J.

(Continued from page 228.)

Rhynchagrotis alternata, Grt.

One of the well-known, widely-distributed species which does not vary greatly. It is almost as large as *variata*, but not so broad-winged, the colours are usually of some shade of luteous, more or less mottled, and with the terminal space paler, though rarely contrasting. From all its allies it differs in the large, ovate, oblique orbicular and large reniform, which may be kidney-shaped or a little constricted ; both maculæ pale-ringed. The transverse maculation is usually all present, but broken. Localities represented in the material before me range throughout the Northern States and Canada to the Rocky Mountains, southward down the Mississippi Valley into Ohio, and along the Atlantic Coast to the District of Columbia.

Rhynchagrotis Belfragei, Sm.

Similar to *alternata* in size, but narrower winged, darker and even in colour, the median lines almost lost. The ordinary spots are concolorous, narrowly pale-ringed, smaller than in its ally, the orbicular more nearly round.

Only 2 ♂'s are at hand, from Texas, and they are from the original type lot taken by Belfrage. It is strange that it has not been turned up again in more recent collections.

Rhynchagrotis anchocelioides, Gn.

Better known as *cupida* in collections, and locally not uncommon. It is almost as large as *alternata*, but is red or brown in colour, not mottled, and with a distinct blackish mark on costa preceding the s. t. line. In the normal form the maculation is obscure, the median lines barely marked, the ordinary spots only a little darker.

What we have always known as *brunneipennis*, but which seems nearer to what Hampson calls *cupida*, Grt., is a distinctly smaller form, with the median lines distinct though broken, the ordinary spots pale-ringed and blackish centered, the s. t. space distinctly darker. I have suspected two species, and am not sure yet that there is only one ; but all of the 13 examples of this type before me are females, and the change in form is somewhat gradual.

Nevertheless, the last word on this species has not been said.

Rhynchagrotis cupidissima, Grt.

There is a long series collected by Mr. Buchholz in Yavapai County, Arizona, that shows a fine series of variations. As compared with the preceding, this is a slightly larger species, tending to luteous or creamy, a red tinge being exceptional, and usually accompanied by a dark s. t. shade preceding the s. t. line, while the terminal space becomes paler. There is rarely a distinctly darker costal blotch preceding s. t. line, although the s. t. shade is always best marked on the costa. The secondaries are almost blackish in both sexes, and the species is, on the whole, very characteristic.

The range of distribution is wide, specimens from Chicago matching others from Arizona so closely that no differences are notable, and California examples matching others from New Mexico. The Chicago examples were taken by Mr. Healy in June and August, and while I questioned the accuracy of the records when the specimens were first received, there seems to be no doubt that the specimens were actually taken there.

Rhynchagrotis trigona, Sm.

This species differs at once from all the preceding in the shorter, broader, more triangular wings. The primaries are usually of some shade of pale luteous, tending to receive a reddish admixture in one direction and a smoky admixture in another. As a rule, while all the maculation is present in the specimens, it is scarcely relieved and does not disturb the apparent uniformity of the wing. Exceptionally the ordinary spots will become black, contrasting, and the lines, or some of them, may be blackish.

I have a long series of examples from Colorado Springs in June and July, a very long series taken by Mr. Buchholz in Yavapai Co., Arizona, in July, and a small series from Fort Wingate, New Mexico, in July. Altogether over 100 examples, and enough to get a fairly good idea of what the species looks like.

Rhynchagrotis sambo, n. sp.

Has the *trigonate* primaries of *trigona*, but is smaller and the wings are a little longer, not quite so stubby. Maculation also as in *trigona*, but much better defined, the ordinary spots being usually black or contrastingly darker, while the s. t. line is pale, preceded by a distinct blackish or dusky shading. While there are some almost uniform examples, the tendency is all in the opposite direction, the basal area becoming darker between the basal and t. a. line until a conspicuous black band appears; the s. t. space in turn may also become darker until it is completely black-filled; one example, with basal and s. t. bands and the ordinary spots lost, presenting an appearance that proved puzzling until the series now in hand was examined. Secondaries blackish, fringes rufous.

Expands.—1.16–1.28 inches = 29–32 mm.

Habitat.—Kaslo, British Columbia, July and August, Mr. Cockle; Peachland, B. C., in July, Mr. Wallis, through Dr. Fletcher; Ainsworth, B. C., in July, Mr. Findlay, also through Dr. Fletcher.

A series of 12 ♂'s and 12 ♀'s, most of them in good or fair condition, and while extremely variable, yet in altogether a different direction from *trigona*, which is approached only in one or two very uniform examples.

Rhynchagrotis alcandola, Sm.

Ground colour pale luteous-gray. Sides of palpi dark brown. Primaries very uniform in general tint. Basal line barely indicated on costa. T. a. line faintly indicated by scattered black scales, its course outwardly oblique. T. p. line geminate, consisting rather of venular points connected by black scales, very evenly outcurved over the cell and very slightly incurved below it. The s. t. space is black powdered, deepening to a distinct shade before the pale, slightly irregular s. t. line, which is the most obvious feature of the wing. Small terminal black points in the interspaces, and a pale yellow line at base of fringes. Orbicular irregular, oblique, blackish-filled, with narrow yellow defining line. Reniform large, blackish-filled, with a narrow yellow defining line; nearly upright, a little drawn in at centre. Secondaries smoky, paler at base. Beneath powdery, with an extramedial dusky line and a discal spot.

Expands.—1.40 inches = 35 mm.

Habitat.—Yavapai Co., Arizona, Oct. 4, Mr. Hutson.

One female, in fair condition only. Prof. F. H. Snow has other examples, and I sent him the MSS. name some time since, expecting to get additional material for the description. It is to validate the name sent out that I base the species on a single defective example, knowing that there are other and better ones in collections.

The species is perhaps nearest to *alternata*, but obviously distinct in the course of the s. t. line, the dark s. t. space and in the form of the ordinary spots.

BLENNOCAMPINÆ—DESCRIPTIONS OF NEW GENERA AND SPECIES—SYNONYMICAL NOTES.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

The genera of the subfamily Blennocampinæ, as understood by the writer, can be differentiated by the following characters: front wings with the radial cross-vein, the radio-medial cross vein, and the free parts of R_4 and R_5 always present; the medio-cubital cross-vein joined to the vein $Sc + R + M$ at or near the origin of media, its distance from media always less than one-half the length of the cross-vein, and always parallel to the vein M_{3+4}; the base of the third anal vein atrophied, or at least in part, so that the anal cells are of the petiolate type; the antennæ with nine segments; the body short and stout.

Selandria (Blennocampa) floridana, Cr.—This species belongs to the genus *Pareophora*.

Neopareophora, n. gen.—Malar space broad and distinct, the eyes being distant from the bases of the mandibles; antennæ with the third segment subequal in length with the fourth; mesothoracic epimera not with a transverse suture below the episternum, separating off a præsternum; claws simple, without a tooth. Type *Neopareophora Martini*, MacG.

Neopareophora Martini, n. sp.—Body black, with the labrum, the mandibles, the prothorax, the tegulæ, the mesopleura, side lobes of the mesonotum, the legs, the venter and the tip of the abdomen yellow or rufous; cerci elongate; saw-guides obliquely truncated at apex; wings hyaline. Length, 4 mm.

Habitat: West Springfield, Mass. (J. O. Martin).

This species is named after my friend, Mr. James O. Martin.

Neopareophora scelesta, n. sp.—Body black, with the labrum, the mandibles for the most part, the front legs, more or less infuscated at base and apex, and the middle legs beyond the apices of the femora rufous; cerci hardly projecting; saw-guides large and obliquely rounded to an apex above; wings infuscated. Length, 7 mm.

Habitat: Black Mts., North Carolina (William Beutenmuller).

This species resembles *Selandria (Monophadnus) scelesta*, Cr., very closely, and for some time was considered the same as that species.

Phymatocera nigra, Harrg.—Through the kindness of Mr. Harrington, I have been able to examine type specimens of this species, and find that it belongs to the genus *Neopareophora*. Konow has referred this species incorrectly to *Rhadinoceræa*.

Neotomostethus, n. gen.—Malar space broad and distinct, the eyes being distant from the base of the mandibles; antennæ with the third segment longer than the fourth; mesothoracic epimera with a transverse suture below the episternum, separating off a præsternum; claws with a small tooth within before the apex. Type *Neotomostethus hyalinus*, MacG.

Neotomostethus hyalinus, n. sp.—Body black, with the tegulæ and the legs below the knees, except the apices of the posterior tibiæ and tarsi, white; antennal fovea broad and rounded; antennal furrow wanting on the front; wings hyaline. Length, 6 mm.

Habitat: McLean, N. Y.

Rhadinoceræa similata, n. sp.—Body black; the wings strongly infuscated; the postocular area elongated; the ocellar basin distinct; the saw-guides rounded at apex to a blunt point above. Length, 8 mm.

Habitat: Ithaca, N. Y., and Agricultural College, Mich.

Hypargyricus, n. gen.—Malar space broad and distinct, the eyes being distant from the base of the mandibles; antennæ with the third segment subequal in length to the fourth; mesothoracic epimera not with a transverse suture below the episternum; claws cleft at apex, the inner tooth nearly as long as the outer. Type *Hypargyricus infuscatus*, MacG.

Hypargyricus infuscatus, n. sp.—Postocular area strongly elevated; saw-guides straight on the upper and lower margins, and rounded to a blunt point at middle of apex; body black; the front femora and tibiæ more or less white in front, suffused with black; wings infuscated. Length, 8 mm.

Habitat: Ithaca, N. Y.

Selandria (Phymatocera) fumipennis, Nort.—This species belongs to the genus *Hypargyricus*. The genus *Phymatocera*, so far as I am aware, does not occur in America.

Isiodyctium atratum, n. sp.—Body black, with the clypeus, the labrum, a spot on the mandibles, the collar narrowly, the tegulæ, a narrow line on the posterior margin of the abdominal segments, broadest on the venter, and the legs, brownish-white; a band on the posterior margin of each lobe of the mesonotum, the scutellum, and the median tergal abdominal segments more or less rufous; saw-guides concave above and convex below, broadly rounded at apex to a point above; wings hyaline. Length, 6 mm.

Habitat: Ames, Iowa (E. D. Ball).

Periclista confusa, n. sp.—Body black, with the clypeus, the labrum, the collar broadly, the tegulæ, the legs beyond the coxæ, and the abdomen at sides above and for the most part beneath, luteous, shading to brownish; the median lobe of the mesonotum for the most part and the pleura, brown; the ocellar basin flat and distinct; the postocular area not marked in front by a furrow; the front finely punctured; the fourth segment of the antennæ longer than the fifth; the wings hyaline. Length, 5 mm.

Habitat: Ithaca, N. Y.

Selandria (Monophadnus) marginicollis, Nort.—An examination of a type specimen proves this species to belong to the genus *Periclista*, and to be very similar in coloration to *Periclista purpuridorsum*, Dyar.

Tomostethus.—There are three species in the Eastern United States belonging to this genus, *Selandria (Monophadnus) bardus*, Say, *Selandria (Blennocampa) inabilis*, Nort., and the following new species:

Tomostethus Nortonii, n. sp.—Body black, with the labrum, a fine line on the collar, the tegulæ, the front legs below the middle of the femora, and the middle and hind legs beyond the knees, white; the saw-guides concave above and broadly convex below, obliquely, truncately rounded to a point at apex above; wings hyaline. Length, 6 mm.

Habitat: Ames, Iowa (E. D. Ball).

Named after Edward Norton, the pioneer student of the North American species of Tenthredinoidea.

Monophadnus distinctus, n. sp.—Body black, with the labrum, the tegulæ, and the legs below the knees, white; the antennal furrow continuous and distinct from the clypeus to the occiput; the ocellar basin distinct; the scutellum coarsely punctured behind at sides; the appendage of the scutellum flat and impunctate; the wings hyaline. Length, 7 mm.

Habitat: Lake Forest, Ill. (J. G. Needham).

Monophadnus minutus, n. sp.—Body black, with the tegulæ, the corners of the prothorax somewhat, and the legs below the knees, white; the front with a deep, broad puncture on each side above the lower end of the antennal furrow but not connected with it; scutellum with a few scattered coarse punctures behind; the scutellar appendage flat and impunctate; the antennal fovea continues with the ocellar basin; the wings hyaline. Length, 5 mm.

Habitat: Milwaukee, Wisconsin (Ward).

Monophadnus bipunctatus, n. sp.—Body black, with the tegulæ and the legs below the knees, white; the antennal furrow interrupted on the front; front never with a large puncture on each side; the scutellum coarsely punctured at sides behind; the scutellar appendage flat and not carinate at middle; the saw-guides obliquely rounded to a blunt point at apex; the wings slightly infuscated. Length, 6 mm.

Habitat: Ithaca, N. Y.

Monophadnus æqualis, n. sp.—Body black, with the tegulæ, the pronotum for the most part, the front legs beyond the bases of the femora, the middle and hind legs beyond the knees, white; the antennal furrow interrupted on the front; front never with a large puncture on the sides, and finely punctured; the ocellar basin fairly distinct; the scutellum and the metathorax uniformly, densely punctured; the saw-guides oblique at apex and pointed. Length, 5.5 mm.

Habitat: Ithaca, N. Y.

Monophadnus plicatus, n. sp.—Body black, with the tegulæ, the margin of the pronotum more or less, and the legs beyond the knees, white; the head with the V-shaped furrow behind the front ocellus distinct; the antennal furrow interrupted on the front; front never with a large puncture on each side; the scutellum more densely punctured than the metathorax; the scutellar appendage longitudinally carinate at middle; the saw-guides with the two edges parallel and obliquely truncate at apex; wings yellowish hyaline. Length, 6.5 mm.

Habitat: Ames, Iowa (E. D. Ball).

Monophadnus transversus, n. sp.—Body black, with the labrum, the tegulæ, the pronotum entirely, the legs beyond the knees, and a narrow margin to the apex of each tergal and ventral segment, white; head with the V-shaped furrow behind the front ocellus indefinite, almost obliterated; antennal furrow interrupted on the front; the front never with a large puncture on each side; the scutellum more densely punctured than the metathorax; the scutellar appendage longitudinally carinate at middle; the saw-guides with the two sides parallel, squarely truncated at apex, with the corner rounded; the wings yellowish hyaline. Length, 6 mm.

Habitat: Michigan.

Paracharactus, n. gen. Malar space narrow and indistinct, hardly more than a line beneath the eyes; mesothoracic epimeron not with a transverse suture below the episternum separating off a præsternum: claws with an erect tooth at middle. Type, *Paracharactus obscuratus*, MacG.

Paracharactus obscuratus, n. sp.—Body black, with the tips of the clypeus, the labrum, the hypoclypeal area, the angles of the prothorax, the posterior third of the mesopleura, and the front and middle legs below the knees, yellow or rufous ; the ocellar basin indistinct. Length, 5 mm.

Habitat : Ithaca, N. Y., and West Spring, Mass. (J. O. Martin).

Sclandria (Phymatocera) rudis, Nort. This species belongs to the genus *Paracharactus*.

Neocharactus, n. gen.—Malar space narrow and indistinct, hardly more than a line beneath the eyes ; mesothoracic epimeron not with a transverse suture below the episternum separating off a præsternum ; claws with two erect teeth at middle. Type, *Neocharactus Bakeri*, MacG.

Neocharactus Bakeri, n. sp.—Body black, with the clypeus, the labrum, a spot on the mandibles, the tips of the first and second segments of the antennæ, the tegulæ, the corners of the prothorax in part, a line on the apex of each abdominal segment, somewhat indistinct at middle, the front and middle coxæ beneath, and the remainder of the legs beneath in great part, white ; the third segment of the antennæ longer than the fourth ; the head more or less aeneous and finely punctured ; the antennal fovea twice as long as broad, the sides square ; a triangular area around the median ocellus ; the wings hyaline. Length, 5 mm.

Habitat : Santa Clara Co., California (Carl F. Baker).

Monophadnoides conspicuus, n. sp.—Body black, with the tegulæ, the pronotum, the front legs beyond the trochanters, and the middle and hind legs beyond the middle of the femora, luteous ; abdominal segments one to five yellowish-rufous ; the front with a pit-like puncture on each side ; the antennæ with the third segment shorter than segments four and five together ; the saw-guides of moderate width, straight above and below, obliquely rounded to a point above at apex ; the wings hyaline. Length, 6.5 mm.

Habitat : McLean, Mass.

Monophadnoides conspiculata, n. sp.—Body black, with the collar narrowly, the tegulæ, the legs below the knees, white ; the antennæ with the second segment longer than broad ; front with a pit-like puncture on each side ; the pentagonal area wanting ; the scutellum wholly smooth ; the saw-guides straight above, convex below and obliquely, emarginately truncated at apex ; wings hyaline. Length, 5 mm.

Habitat : Ithaca, N. Y.

Monophadnoides consobrinus, n. sp.—Body black, with the angles of the pronotum, the tegulæ, the legs below the knees, white; the furrow in front of the postocular area narrow, deep and distinct; the pentagonal area flattened, the walls flat and practically wanting; the third segment of the antennæ not as long as the fourth and fifth together, the second segment broader than long; the scutellum wholly smooth; the saw-guides straight above, convex below, broadly, obliquely rounded to a blunt point at apex above; the wings hyaline. Length, 6 mm.

Habitat: Durham, N. H. (C. M. Weed).

Monophadnoides cordatus, n. sp.—Body black, with the tegulæ, the legs below the knees, white, except that the tips of the tibiæ and tarsi are more or less infuscated; the furrow in front of the postocular area broad, shallow and indistinct; the pentagonal area wholly wanting; the third segment of the antennæ as long as the fourth and fifth together, the second segment broader than long; the scutellum wholly smooth; the saw-guides convex above and below, obliquely truncated to a point at apex above; the wings hyaline. Length, 5 mm.

Habitat: Illinois (Nason).

Monophadnoides concessus, n. sp.—Body black, with the angles of the pronotum, the tegulæ and the legs below the knees, white; the antennæ with the third segment shorter than the fourth and fifth together; the head smooth and polished; the front with a V-shaped furrow behind the median ocellus; the scutellum punctate at apex; the saw-guides straight above and below, obliquely, convexly rounded at apex; the wings white. Length, 6 mm.

Habitat: Ithaca, N. Y.

Monophadnoides crassus, n. sp.—Body black, with the collar narrowly, the tegulæ, the legs below the knees, white; the front without a V-shaped furrow behind the median ocellus; the third segment of the antennæ subequal in length with the fourth and fifth together; the pentagonal area wanting; the scutellum punctate at apex; the saw-guides straight above and below, obliquely rounded to a blunt point at apex and above. Length, 6 mm.

Habitat: Durham, N. H. (C. M. Weed).

Monophadnoides conspersus, n. sp.—Body black, with the angles of the pronotum, the tegulæ, the trochanters, and the legs below the knees, white; the front with a V-shaped furrow behind the median ocellus; the third segment of the antennæ subequal in length with the fourth and fifth together; the pentagonal area wanting; the scutellum finely striate at apex; the saw-guides broad, straight above, strongly convexly rounded from below to the apex above. Length, 5 mm.

Habitat: Ithaca, N. Y.

Monophadnoides costalis, n. sp.—Body black, with the angles of the pronotum, the tegulæ, and the legs below the knees, white; the front without a V-shaped furrow behind the median ocellus; the pentagonal area wanting; the scutellum striate at apex; front with a pit-like puncture on each side; the saw-guides straight above and below, oblique at apex, drawn out into a long point above. Length, 6 mm.

Habitat: Wellesley, Mass. (A. P. Morse).

Monophadnoides coracinus, n. sp.—Body black, with the angles of the pronotum narrowly, the tegulæ, and the legs below the knees, white; the antennæ with the third segment shorter than the fourth and fifth together; the pentagonal area and the V-shaped furrow behind the median ocellus wanting; the front not with a pit-like puncture on each side; the scutellum smooth, at most extremely, finely, rugosely roughened. Length, 6 mm.

Habitat: Wellesley, Mass. (A. P. Morse).

Monophadnoides collaris, n. sp.—Body black, with the angles of the pronotum broadly, the tegulæ, the apices of the coxæ, the trochanters more or less, and the legs below the knees, white; the antennæ with the third segment shorter than the fourth and fifth together; the pentagonal area indistinctly impressed; the V-shaped furrow behind the median ocellus distinct; the scutellum distinctly punctured at sides; the saw-guides broad, convex above and below, broadly, obliquely rounded to a blunt point at apex above. Length, 6 mm.

Habitat: Ithaca, N. Y.

Aphanisus, n. gen.—Malar space narrow and indistinct, hardly more than a line beneath the eyes; the antennæ with the third segment always longer than the fourth; mesothoracic epimeron not with a transverse suture below the episternum; front wings with the radial cross-vein and the free part of R_4 inclined at different angles; the hind wings with the transverse part of M_2 present; the claws cleft at apex. Type *Aphanisus lobatus*, MacG.

Aphanisus lobatus, n. sp.—Body black, with the pronotum, the tegulæ, the legs, and a fine margin on the apex of the abdominal segments, white or luteous; front with a distinct pentagonal area, its lateral walls sharp and distinct; the front smooth and polished and without a pit-like puncture; the scutellum impunctate at sides; the wings somewhat infuscated; the saw-guides broad, straight above, broadly convexly rounded from the base to a hooked point above. Length, 5 mm.

Habitat: Ormond, Florida (Mrs. A. T. Slosson).

Aphanisus muricatus, n. sp.—Body black, with the collar, the tegulæ and the legs below the knees, the femora more or less infuscated, white; front with a distinct pentagonal area, its lateral walls low and indistinct; the front finely, rugosely roughened; the front without a pit-like puncture on each side; the wings hyaline; the saw-guides straight above, convexly rounded from below to a blunt point above. Length, 5 mm.

Habitat: Ithaca, N. Y.

Aphanisus odoratus, n. sp.—Body black, with the collar, the tegulæ, and the legs below the knees, white; the front with the pentagonal area entirely wanting, and with a pit-like puncture on each side connected below with the antennal furrow; the scutellum punctured at sides; the wings hyaline; the saw-guides straight above, convex below, and obliquely rounded to a point above. Length, 5 mm.

Habitat: Ithaca, N. Y.

Aphanisus nigritus, n. sp.—Body black, with the collar, the tegulæ, and the legs beyond the middle of the femora, white; front with the pentagonal area wanting, and not with a V-shaped furrow behind the median ocellus, and with a pit-like puncture on each side but not connected with the antennal furrow; the scutellum roughened at sides; the saw-guides straight above and convexly rounded from base to a blunt point above; the wings hyaline. Length, 6 mm.

Habitat: Riverton, New Jersey (H. L. Viereck).

Blennocampa abnorma, n. sp.—Body black, with the tegulæ and the legs below the knees, the tibiæ more or less infuscated, white; the front without a V-shaped furrow behind the median ocellus; the pentagonal area wanting; the clypeus angularly emarginate; the antennæ with the third segment at least as long as the fourth and fifth together; the wings hyaline. Length, 5.5 mm.

Habitat: Ithaca, N. Y.

Blennocampa antennata, n. sp.—Body black, with the tegulæ and the legs below the knees, luteous; the front tibiæ and tarsi more or less infuscated; the front with a V-shaped furrow behind the median ocellus; the antennal fovea with a rounded papilla at centre; the antennæ with the third segment at least as long as the fourth and fifth together; the scutellum smooth at apex; the saw-guides convex above and below and obliquely, convexly truncated at apex. Length, 6 mm.

Habitat: Durham, N. H. (C. M. Weed).

Blennocampa aperta, n. sp.—Body black, with the tegulæ and the legs below the knees except the apices of the tibiæ and the greater part of the tarsi, white; the antennal fovea flat, without a papilla at centre; the front with a V-shaped furrow behind the median ocellus; the antennæ with the third segment at least as long as the fourth and fifth together; the scutellum smooth at apex; the saw-guides strongly convex above and below, and rounded to a point at apex. Length, 6 mm.

Habitat: West Haven, Ct. (E. B. Whittlesey).

Blennocampa angulata, n. sp.—Body black, with the tegulæ and the legs below the knees, except the apices of the tibiæ and the tarsi, white; the antennal fovea an elongate furrow; the front with a V-shaped furrow behind the median ocellus; the scutellum finely striate at sides; the saw-guides broad, straight above; convex below, obliquely truncated at apex. Length, 6 mm.

Habitat: Wellesley, Mass. (A. P. Morse).

Blennocampa adusta, n. sp.—Body black, with the tegulæ and the legs, except the tips of the middle and hind tibiæ and tarsi, white; the antennal fovea with a large rounded papilla at centre; the front with a V-shaped furrow behind the median ocellus; the antennæ with the third segment at least as long as the fourth and fifth together; the scutellum punctured at sides; the saw-guides straight above and convexly, obliquely rounded from base to apex above. Length, 6 mm.

Habitat: Wellesley, Mass. (A. P. Morse).

Blennocampa acuminata, n. sp.—Body black, with the tegulæ and the legs below the knees, luteous; the antennal fovea flat and without a papilla at centre; front with a V-shaped furrow behind the median ocellus; the third segment of the antennæ at least as long as the fourth and fifth together; the scutellum punctured at sides; the saw-guides broad, straight above and below, broadly, convexly and somewhat obliquely rounded at apex. Length, 6 mm.

Habitat: Chicopee, Mass. (J. O. Martin).

Selandria (Blennocampa) parva, Cress.—This species belongs to the genus *Erythraspides*. Adults were bred by Professor Comstock, from larvæ collected on Fuchsia.

NOTES ON EUCHLOE HYANTIS, EDW.

BY KARL R. COOLIDGE, PALO ALTO, CALIF.

The history of *Euchloe hyantis* well illustrates the state of confusion of some of the western *Euchloeinæ*. In 1871 W. H. Edwards described, in the Transations of the American Entomological Society, both sexes of a species of *Euchloe (Anthocharis)*, which he called *hyantis*, the types coming from Mendocino, Calif. In his Pac. Coast Lepidoptera papers (Proc. Calif. Acad. Sci., No. 22, 1876), Hy. Edwards writes: "*Anthocharis creusa*, Dbl. I have little doubt, from an examination of a figure by Mr. Butler, of the British Museum, kindly loaned to me by Mr. W. H. Edwards, that this species is the same as *A. hyantis*, Edw., which is well known to occur in the Sierra Nevadas, and in other high lands of the State. It is said by Dr. Behr to be far from rare in the neighbourhood of Oroville, and has been subsequently taken by Baron R. Osten Sacken in the Yosemite Valley, and by myself near Lake Tahoe. It is probably often confounded with *A. ausonides*, but it is abundantly distinct." W. H. Edwards, in his list of *Rhopalocera*, published in 1877, places it as a synonym, and in his later list (1879) it is entirely omitted. In 1878, however, Hy. Edwards changed his former opinion and gives it specific rank.

Of the later authors Beutenmuller (Revision N. Am. species of *Euchloe*†) places *hyantis* as a synonym of *creusa*, and describes as new, under the name *lotta*, the form heretofore known as *creusa*.

Creusa was named by Doubleday and Hewitson, and, according to Beutenmuller, the figure given in their " Genera of Diurnal Lepidoptera " agrees well with *hyantis* or possibly *ausonides*. There is no mention of *hyantis* in Holland's Butterfly Book or in the Check List of American Macro-Lepidoptera published by the Brooklyn Entomological Society in 1882. Dr. Skinner* makes *coloradensis*, Hy. Edw., a synonym of *ausonides*, and places *hyantis* as a variety. The same writer in his supplement puts *elsa*, Beut., and *lotta*, Beut., as varieties of *creusa*. Smith in his catalogue gives *hyantis* specific rank, as does W. G. Wright (Butt. West Coast). Dyar[1] places *hyantis* as a variety of *ausonides*. Dr. A. G. Butler (CAN. ENT., XXXI, 1899, p. 19), writes: " As regards *E. creusa*, I believe to vary seasonably as much as its very close ally, *E ausonia ;* the attempt to distinguish between *E. ausonides* and *E. hyantis* looks to me like a failure, not that they cannot be readily distinguished by size, form of secondaries, depth of ground-tint, and size of white spots on under surface, but because these differences are to be seen in undoubted season variations in the European form, *E. ausonia*, and because if *E. ausonides* is distinct from *E. hyantis*, the Vancouver form, which differs in the pattern of the under surface, has an equal claim to separation. As regards typical *E. creusa*, which Dr. Beutenmuller considers to be *E. hyantis*, I can definitely assure him that the type (which we possess) agrees with his var. *elsa*. My idea of this species is that it can be arbitrarily sorted out into seven graded forms: *E. ausonides*, *E.* var. from Vancouver, *E. hyantis*, *E. lotta*, *E. coloradensis*, *E. creusa* = *elsa*."

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†Am. Mus. Nat. Hist., x., p. 235–248. (1898).

*A Syn. Cat. of N. Am. Rhop., Phila., 1898.

[1] Bull. U. S. Nat. Mus., No. 52, Wash., 1902.

In the same volume of the CANADIAN ENTOMOLOGIST (p. 56) Beutenmuller says: "In answer to Dr. Butler's comments upon my revision of the species of *Euchloe*, I could state that Dr. Butler may possibly be right in considering *creusa* (var. *elsa*), *hyantis* and *lotta* seasonal forms of *ausonides*, but with the present knowledge it is not possible to place them so, and for this reason I concluded it would be best to allow the species to remain distinct until more light could be obtained on the subject. At any rate, I was certain that what we had labeled in our collections as *creusa* was not Doubleday and Hewitson's species, which Dr. Butler definitely asserts is my var. *elsa*. What seems strange to me is, how was it that Edwards did not recognize the figure of *creusa* sent to him by Dr. Butler? *Creusa* (var. *elsa*) cannot be mistaken for either *hyantis* or *lotta* (so-called *creusa*). Doubleday and Hewitson did not give a description of *creusa*, and their figure of the species is unrecognizable, consequently has no scientific value."

It has been supposed that *hyantis* is the spring brood of *ausonides*, but Edwards (CAN. ENT., XXIV, p. 109) contradicts this, saying that *ausonides* is monogenentic, as he had bred a few typical examples in March. Last year, however, Mr. E. J. Newcomer and myself succeeded in breeding *ausonides* throughout all its stages, and a fair percentage of the pupæ emerged in early summer.[2] These examples were certainly not *hyantis*, and differed from the spring brood in being slightly larger and perhaps more yellowed. In order to straighten out this group, it will be necessary to breed out the various forms. I would like very much to

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[2] The fact that the European *ausonia* was 2-brooded and the American *ausonides* single-brooded, was one of the distinctions given by Edwards and Beutenmuller for distinguishing the two.

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receive any eggs of such species, particularly from the mountainous regions of the west. The synonomy, as now known, I would place as follows:

ausonides, Bdv.
    = coloradensis, Hy. Edw.[3]
creusa, Dbl. & Hew.
    = var. elsa, Beut.
    var. hyantis, Hy. Edw.
    var. lotta, Beut.

ERRATA.

The following corrections may be made to my Notes on the new *Rhopalocera* described by W. G. Wright in his Butterflies of the West Coast:

P. 238—No. 178, *Melitæa eremita*, Wright, = *palla*, ♀ *(blackish form)*.
No. 181, *Melitæa sabina*, Wright, = *palla*, ♀ *(reddish form)*.
No. 186, *Melitæa leona*, Wright, = *obsoleta*, Hy. Edwards (from type locality).

SOME RECENT PAPERS ON HEMIPTERA.

BY J. R. DE LA TORRE BUENO, NEW YORK.

From time to time, notes, papers and monographs on some branch of Entomology are published, but, unfortunately, not always in the most widely read nor even accessible publications. Such, for instance, are three papers, one of great interest, not only to American Hemipterists, but also to the general student of biology. Of the other two, one should receive the notice of Hemipterists in general, and the other of those whose interest is mainly in water-bugs.

The first is a paper on fauna, by Dr. G. Horvath, of Buda-Pesth, entitled, "Les Relations entre les Faunes Hémiptérologiques de l'Europe et de l'Américane du Nord." This important contribution was read at the opening session before the 7th Zoological Congress at the Boston meeting in 1908, and its author now publishes it in the, to us, inaccessible "Annales Histoirco-naturales Musei Nationalis Hungarici."[1]

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[3] Hardly worthy of rank, as, in good series, all intergradations are to be found.

(1) 1908, vol. vi., pp. 1-14.

He calls attention to the great resemblance already noted between the faunas of Europe and North America, going so far in many cases as to the identity of genera and species, and this after rejecting mistaken identifications on the one hand, and demonstrating the identity of American species, reputed as new, with well-known European forms on the other. His researches have given 161 species and 261 genera of European-American Hemiptera, and this includes the imported and naturalized forms, of which 31 have come to America from Europe, and only 2 have been exported to the other side of this continent. The imported species, except *Clinocoris lectularius* and *Reduvius personatus*, are all Homoptera—more or less injurious to cultivated plants. Deducting imported species (the number of which does not include certain forms held by our entomologists to be imported because found here later than in Europe, from which view Horvath differs), there are 128 species common to both continents, 59 Heteroptera and 69 Homoptera. In the former he lists 3 Pentatomias (or Cimicids); 9 Lygæids; 4 Aradids; 1 Gerrid, *Gerris rufoscutellatus*, Latr.; 6 Reduviids, of which 5 are Reduvioli; 4 Acanthids (or Saldids); 2 Anthocorids; no less than 28 Mirids (or Capsids; 1 Notonectid and 2 Corixids. The Homoptera are mainly Jassids, Cercopids, Aphids (by far the most abundant) and Coccids.

In examining these lists one is struck by the fact that the vast majority belong to the colder parts of Europe, and only 6 are from the South, and also found in the Southern United States. Their artificial spread is inadmissible, and while he does not consider theories of a great continent between Europe and America, nor that the dispersal was by way of Iceland and Greenland when these had a milder climate, Dr. Horvath considers that the fact that the common species are also Palæarctic forms evidently shows that the dispersal was by way of Behring Strait. In confirmation of this supposition we have the fact[2] that five species have been found only at the extreme north-west of America, and that certain others have not penetrated far into the Palæarctic region, and still others are common only to north-western America and north-eastern Asia.

As to the genera, he finds that of those common to the two faunas, no less than 138 are of Palæarctic origin, 31 are Nearctic, 23 Holarctic, 13 Neotropical, 5 Oriental, 4 Ethiopian, 12 intertropical and 22 cosmopolitan.

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(2) Dr. Horvath cites six, but one is known to me *positively* to be a misidentification.

Moreover, there are 8 of uncertain origin. From this tabulation he deduces that nearly 84 per cent. of the common genera have migrated by the Behring route.

His conclusions are as follows :

1st. There is a certain number of species and genera of Hemiptera which are common to Europe and North America.

2nd. The greater part of these common Hemiptera is native to the Palæarctie region and belongs to the temperate zone.

3rd. The migration of these Hemiptera has taken place mainly by way of Behring Straits.

4th. The few southern types common to the two continents originated in the intertropical region, whence they came independently to enrich the Palæarctic and Nearctic faunas.

5th. Artificial importation plays only a secondary role in the spread of European-American Hemiptera ; but it is Europe that has supplied America, along with cultivated plants, with more species than the latter has received from Europe.

(To be continued.)

THE BITER BIT.

Everybody knows that toads are great insect destroyers, accepting nauseous species, and not refusing even stinging bees, so I was surprised the other day, on hearing the cry of a toad in pain, to find one nearly the size of a hen's egg attacked by a ground beetle a little over an inch long and half an inch broad, belonging to the genus Dicaelus. These beetles are broad and flat, black, with a blue line on the outer edges of the elytra. The toad was held by the middle of the upper arm by the powerful jaws of the beetle, and vainly struggled to push off its assailant with the other limbs, and the beetle actually tried to carry the toad away, pushing it ahead two or three inches while I watched. The toad had a bloody wound in its shoulder, and bite-marks, corresponding to the beetle's jaws, all along its flank and thigh, so the fight must have lasted a considerable time. The beetle frequently relaxed its hold slightly to take a better bite; it held on like a bulldog, with no intent of letting go while I carried them to the house to show to my wife, and indeed I had to pry the beetle's jaws apart to separate the combatants. These Dicaelus beetles are rather common here, but I never knew them to prey on vertebrate animals before.—THEODORE L. MEAD, Oviedo, Fla.

NOTES ON FLEAS COLLECTED ON RAT AND HUMAN HOSTS IN SAN FRANCISCO AND ELSEWHERE.

BY R. W. DOANE, STANFORD UNIVERSITY, CALIF.

In Feb., 1908, Dr. W. B. Wherry, of the Dept. of Public Health of San Francisco, sent to the University for identification a few vials of fleas, most of which had been collected from rats in the plague-stricken districts and from doctors, nurses and others who had been at work in these districts. Those from the rats showed the following species : *Ceratophyllus fasciatus*, Bosc., 1 ♂, 6 ♀'s ; *Ctenocephalus canis* (Curtis), Baker, 2 ♀'s ; *Loemopsylla (Pulex) cheopis*, Rothschild, 16 ♂'s, 19 ♀'s. Five ♂'s and one ♀ of *Ctenopsyllus musculi* (Duges), Wagner, were taken from a mouse in the plague laboratory, and 220 specimens of *Pulex irritans*, Linn., were taken from human hosts or on their clothing in the plague laboratory and hospital and in the refugee camps where human plague cases were of frequent occurrence. A single specimen of an undetermined species of *Ceratophyllus* was also taken from a human host.

A later sending from Dr. Wherry, April, '08, showed 88 specimens of *Ceratophyllus fasciatus* and 1 *Ctenopsyllus musculi* from rats, 7 *Loemopsylla cheopis* from mice, 25 *Pulex irritans* and 1 specimen of *Ceratophyllus* sp. from human hosts (one *P. irritans* was from the body of a Chinaman who had died of the plague), and 477 specimens of *Ctenocephalus canis* collected from a single Dachshund pup.

From time to time between March 1st and June 1st, Dr. W. C. Rucker, executive officer of the U. S. Public Health and Marine Hospital Service, has sent me many vials of fleas taken from rats and humans. These were mostly collected by the small army of rat catchers in the different sections of the city. A summary of all these sendings shows 619 specimens of *Ceratophyllus fasciatus*, 163 specimens of *Pulex irritans*, 56 *Ctenopsyllus musculi*, 9 *Ctenocephalus canis*, and 139 *Loemopsylla cheopis* from rats, and 668 *Pulex irritans* and 2 *Ceratophyllus fasciatus* from human hosts..

From February to May, Dr. Snow, of Stanford University, had a man catching rats and mice on the campus in order to determine whether any showed symptoms of plague.

From the rats were taken 174 specimens of *Ceratophyllus fasciatus*, 62 *Ctenopsyllus musculi*, and 8 *Hoplopsyllus anomalus*, Baker ; from the mice, 26 *Ceratophyllus fasciatus* and 14 *Ctenopsyllus musculi*.

On examining a number of dead rats in San Jose, that had been brought in for the bounty, I found, on March 14, 7 specimens of *Loemopsylla cheopis*. Only this one lot of rats was examined there.

Summarizing all these lots, we have:

On rats *(Mus norvegicus)*—	
Ceratophyllus fasciatus	863
Pulex irritans	163
Loemopsylla cheopis	139
Ctenopsyllus musculi	118
Hoplopsyllus anomalus	8
Ctenocephalus canis	9

On humans—	
Pulex irritans	680
Ceratophyllus fasciatus	2
Ceratophyllus sp	2
On mice *(Mus musculus)*—	
Ceratophyllus fasciatus	25
Ctenopsyllus musculi	14
Loemopsylla cheopis	7
On mice *(Microtus californicus)*	
Ceratophyllus fasciatus	1

A study of these records shows that *Loemopsylla cheopis*, which is known as the plague flea in countries where the disease is epidemic, is well established in San Francisco, and is spreading to other near-by cities. Doubtless a search would reveal it in many localities. It is interesting, too, to note that out of the 672 fleas taken from human beings, some of them patients who were sick or had died of the plague, from attendants in the hospitals, and from men engaged in catching the rats, not a single *Loemopsylla cheopis* was found. On the other hand, *Pulex irritans*, which is the most common human flea, has been found quite abundantly on rats. One sending from Dr. Rucker contained 81 specimens of *P. irritans* and no other species. These were collected from 18 rats taken in houses and sewers in one of the infested districts. It will be noted, too, that *C. fasciatus*, the most common rat flea, was in two instances taken from human beings.

The records from Stanford University show that *C. fasciatus* was more common on mice than *Ctenopsyllus musculi*, the latter being quite common on the rats.

The eight specimens which seem to be identical with Baker's *Hoplopsyllus anomalus*, which was originally described from a *Spermophile* in Southern Colorado, are interesting in that they seem to show a possible connection between the rats and the squirrels. Dr. Blue has often stated that should the plague ever become endemic here it would probably spread from the rats to the ground squirrels, thus making it much more difficult to stamp out.

The single specimen of *Ceratophyllus fasciatus* also shows the possibility of the spread of the plague to the native rats and mice.

Mailed August 4th, 1908.

The Canadian Entomologist.

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THREE NEW NORTH AMERICAN PHLŒOTHRIPIDÆ.

BY J. DOUGLAS HOOD, OFFICE OF THE STATE ENTOMOLOGIST, URBANA, ILL.

In a collection of *Thysanoptera*, kindly sent me for determination by Prof. H. A. Surface, Economic Zoologist of Pennsylvania, I find three new species, described below. Type specimens are in the writer's collection, and in the collection of the Pennsylvania State Department of Agriculture.

PHYLLOTHRIPS, gen. nov.

(*φυλλον*, leaf; *θριψ*, thrips.)

Head about 1½ times as long as wide, subcylindrical, broadest across eyes, narrowed posteriorly. Eyes large, finely faceted, bulging. Vertex elevated, prolonged, overhanging insertion of antennæ, and bearing the anterior ocellus at its extremity. Mouth cone subacute, reaching about four-fifths across prosternum. Prothorax about half as long as head. Legs slender; fore femora not enlarged; fore tarsi unarmed in both sexes. Abdomen slender. Male with a scale at base of tube.

Type.—*Phyllothrips citricornis*, sp. nov.

This genus is erected for the reception of *P. citricornis*, sp. nov., and *Cryptothrips aspersus*, Hinds. It is close to *Liothrips*, Uzel, differing from it in the produced vertex, overhanging ocellus, bulging eyes, and longer head.

Phyllothrips citricornis, sp. nov. (Fig. 15.)*

Female.—Similar in general appearance to *P. aspersus* (Hinds), from which it may be distinguished as follows:

a. Antennæ rather stout; segments 5, 6 and 7 slightly more than one-half as wide as long; segments 1 and 2 nearly concolorous with body; segment 3 pale yellow; rest of antenna shading to dark brown at tip, excepting bases of segments 4 and 5, which are yellowish. Prothoracic spines small, inconspicuous; mid-laterals wanting .. *P. aspersus* (Hinds).

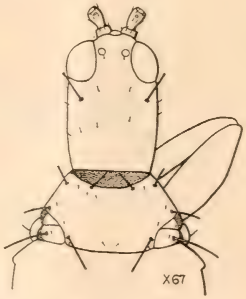

FIG. 15.—Phyllothrips citricornis

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*In the figures all membranous portions are stippled.

aa. Antennæ more slender; segments 5, 6 and 7 slightly less than two-fifths as wide as long; segments 1 and 2 nearly concolorous with body; segment 3 pale yellow; segments 4 to 8 bright lemon-yellow. Prothoracic spines large, rather prominent; mid-laterals present, fully as long as anterior marginals . . . . *P. citricornis*, sp. nov.

The measurements of the female of this species are as follows: Total length, 2.27 mm. (2.08 to 2 46 mm); head, length, .32 mm.; width, .21 mm.; prothorax, length .16 mm.; width (including coxæ) .37 mm.; pterothorax, width, .42 mm.; abdomen, width, .48 mm.; tube, length, .22 mm.; width at base, .078 mm; at apex, .043 mm. Antennæ: 1, 42μ; 2, 64μ; 3, 115μ; 4, 109μ; 5, 92μ; 6, 87μ; 7, 70μ; 8, 41μ. Total, .620 mm.

Described from several macropterous females from the following localities: Illinois—Dubois, Duquoin, Odin, Pulaski, on hickory leaves (L. M. Smith). Pennsylvania—Harrisburg, Rockville, "on wild grape." The dates range from April 28 to July 16.

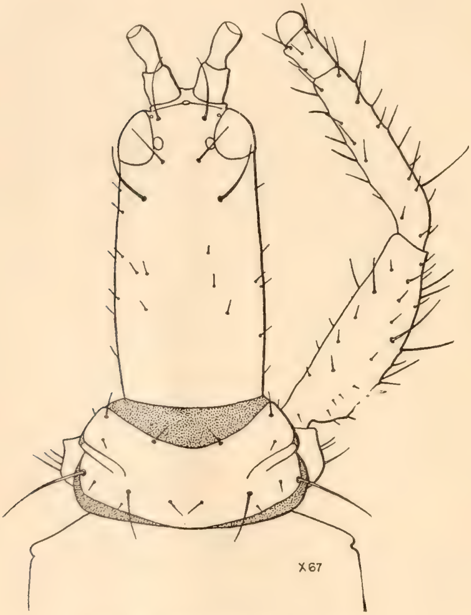

Fig. 16.—Megalothrips (?) spinosus.

Megalothrips (?) spinosus, sp. nov. (Figs. 16 and 17.)

Female.—Length about 4 mm. Colour nearly uniform black, excepting tarsi, which are dark blackish-brown.

Head slightly more than twice as long as wide, broadly rounded in front, sides subparallel; dorsal and lateral surfaces finely transversely striate, sparsely and briefly spinose; anterior portion of head with two pairs of prominent, pointed bristles in addition to the postocular, a shorter pair with their bases slightly behind the posterior ocelli, and a longer pair equal in length to the postocular, with their bases midway between the anterior ocellus and each posterior one. Eyes moderately large, not prominent, scarcely protruding. Ocelli brownish-yellow, anterior ocellus slightly overhanging; posterior ocelli contiguous to light inner borders of eyes, their diameter almost three times that of the facets. Antennæ eight-segmented; segments 3–6 clavate; 7 and 8 fusiform; sense-cones long, slender, transparent. Mouth-cone reaching nearly to base of prosternum, short, broadly rounded; labium surpassing labrum by the length of the basal segment of the maxillary palpus.

Prothorax three-fifths as long as width of head, and (including coxæ) about three times as wide as long; surface finely striate; usual spines all present, slender, pointed, the pair at the posterior angles much the longest; mid-laterals very small. Pterothorax large, rectangular, two-thirds as long as wide. Wings long, reaching about to base of ninth abdominal segment. Anterior femora and tibiæ set with a number of long bristles; anterior tarsus armed with a blunt tooth.

Abdomen moderately stout, equal in width to pterothorax, widest at segment 4, from which it tapers evenly to tube. Tube slightly shorter than head, slender, and of nearly equal diameter throughout, excepting base, which is slightly expanded, and apex, which is slightly constricted; surface spinose.

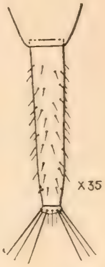

FIG. 17—M. (?) spinosus.

Measurements: Total length, 4.00 mm.; head, length, .64–.74 mm.; width, .30 mm.; prothorax, length .18 mm., width (including coxæ) .56 mm.; pterothorax, width, .67 mm.; abdomen, width, .74 mm.; tube, length .63 mm., width at base .13 mm, at apex .07. Antennæ: 1, 76μ; 2, 95μ; 3, 185μ; 4, 160μ; 5, 150μ; 6, 122μ; 7, 65μ; 8, 76μ. Total, .83 mm.

Described from two macropterous females taken at Harrisburg, Pa., March 10, "in burrows of Lepidopterous or Coleopterous larva in dead willow stem."

Although this species is apparently closely related to *M. bonannii*, Uzel, its generic position is uncertain until the male is known.

Cryptothrips rectangularis, sp. nov. (Figs. 18 and 19.)

Female.—Length about 2.7 mm. Colour nearly uniform black, excepting tarsi and third antennal segment, which are more or less blackish-brown.

Head rectangular, about one and one-third times as long as wide, sides parallel; lateral and dorsal surfaces faintly reticulate, sparsely and briefly spinose; vertex transverse; postocular spines present, pointed. Eyes moderately large, not protruding, occupying the anterior angles of head. Ocelli small, about equal in size to facets of eyes; anterior ocellus not overhanging; posterior ocelli opposite centres of eyes, slightly separated from their inner margins. Antennæ eight-segmented, general colour black; segment 2 paler at apex; segment 3 with two transverse brownish-yellow bands, one at base, the other at middle; segments 3–6 subclavate; segment 7 oblong, pedicellate; segment 8 small, fusiform. Mouth-cone slightly wider than long, reaching about four-fifths across prosternum, apex broadly rounded.

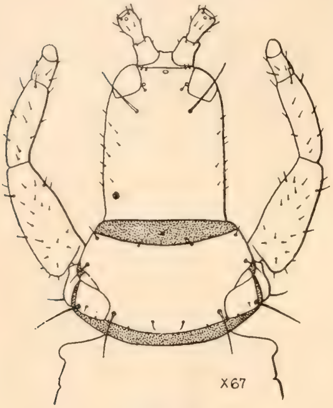

Fig. 18.—Cryptothrips rectangularis.

Prothorax about three-fourths as long as width of head, and (including coxæ) slightly more than twice as wide as long; usual spines all present, the two pairs near the posterior angles much the longest; anterior marginals very small. Pterothorax almost twice as wide as long, slightly wider than prothorax; sides subparallel. Wings lacking. Legs nearly concolorous with body, tarsi somewhat lighter; anterior tarsus unarmed.

Abdomen moderately stout, about one and one-half times as broad as pterothorax, widest at about segment 3, from which it tapers evenly to segment 6, and then rather abruptly to base of tube. Tube slightly less than three-fourths as long as head, tapering almost evenly from base to apex; surface not spinose.

Measurements: Total length, 2.74 mm.; head, length, .37 mm.; width, .26 mm.; prothorax, length, .20 mm; width (including coxæ), .42 mm.; pterothorax, width, .46 mm.; abdomen, width, .64 mm.; tube, length, .26 mm.; width at base, .10 mm.; at apex, .05 mm. Antennæ: 1, 61μ; 2, 73μ; 3, 98μ; 4, 90μ; 5, 87μ; 6, 78μ; 7, 55μ; 8, 42μ. Total, .58 mm.

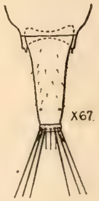

Fig. 19.—C. rectangularis

Male.—Smaller than female (total length about 1.83 mm). Anterior femur slightly swollen; fore tarsus armed with a stout tooth. Tube twice as long as its greatest basal width, and two-thirds the length of head, narrowing rather rapidly in its basal third, and then tapering evenly to apex; surface scarcely visibly spinose.

Described from four wingless individuals collected as follows: Illinois—Urbana, May 12, ♀ and ♂, under dead bark on peach tree (J. D. H.); Urbana, April, ♂, reared from nymph taken on willow tree (J. J. Davis). Pennsylvania—Harrisburg, March 10, ♀, "in burrow of Lepidopterous or Coleopterous larva in dead willow stem."

This species is very close to *C. carbonarius*, Hood, but differs from that species in being much smaller, in lacking the two pairs of prominent bristles in the region of the ocelli, and in the shape of the tube. The prothoracic sclerites differ in size and shape in the two species, and the prothoracic spines do not exactly correspond.

NOTES ON MOSQUITO WORK.

BY HARRISON G. DYAR AND FREDERICK KNAB, WASHINGTON, D. C.

In using the recent literature on mosquitoes, several points have been noted which it seems worth while to record, in order, if possible, to arrest certain errors that have crept into the subject and are being perpetuated. One author copies from another (usually without credit) until the original error becomes almost a classic fact. We wish, therefore, to emphazize these corrections as much as possible in order to counteract this tendency. Some of these errors refer to characters that have been considered of fundamental value in classification, and it is important that they should be pointed out, even if the system of classification now in vogue be not adhered to. They further illustrate the weakness of this system, which we have on several other occasions attacked.

The mosquitoes have suffered in their classification from the fact that the earliest generic separations were made upon the relative lengths of the palpi in the sexes. This is a secondary sexual character, as we have pointed out. Nor have the systematists who have used the palpi in classification made any study of their actual structure, except Neveu-Lemaire, whose results were obtained upon the study of too small material, and when extended show only intergradation. Now, while the separation of these genera on such characters may have been allowable (for even yet many systematists found genera on secondary sexual characters), their elevation to higher groups and subfamilies, as has been done by Theobald and his followers, is indefensible. We are unaware of any other case where authors have presumed to found subfamilies on secondary sexual characters in normal bisexual animals. Furthermore, the system becomes beset with difficulties when one is confronted with a considerable series of species and attempts their classification on these lines. As the characters have really no fundamental importance whatever, it is not surprising to find that they tend to insensibly intergrade. Again, the relative length of the palpi to the proboscis depends in large part upon the length of the proboscis itself, a very variable character, and one of doubtful generic value, which has been wholly ignored in this connection. Dr. Lutz, in an attempt at a concise classification, in drawing the lines between his Metanototrichæ-Heteropalpæ and Metanototrichæ Isomicropalpæ, has been forced to use such distinctions as "♂ palpi one-third as long as the proboscis *(Goeldia)*; ♂ palpi a little longer than in the ♀ *(Sabethinus)*." Genera in which the males are unknown are placed on assumption, and happen to have been generally placed wrongly. *Sabethoides*, for example, which he places in the Isomicropalpæ, has long palpi in the male. In genera of homogenous structure and coloration, the length of the male palpi varies in different species. For example, in *Hæmagogus equinus*, Theob., the male palpi are long, while in several other members of the genus they are short like those of the female. To add to the confusion, Peryassú states that the male palpi of *Stegoconops* are long. He includes two species in this genus, but gives no description of the male of either. One of these species (*leucomelas*, Lutz) we have identified as a species of *Ædes* (as we understand that genus). We do not know the male, but suspect that it has long palpi. The other species included in *Stegoconops* (*capricorni*, Lutz) is the one upon which the genus was founded. We have identified this as a species of *Hæmagogus*, the female agreeing with the original description in every respect, but the male palpi are short, like those of the female. Finally, it generally happens that specimens received for identification are females, and such are entirely unplaceable on the "system." As admitted by Theobald himself when he says, "but unless both sexes are seen, it is quite impossible to place any *Culicid* in any of the sections into which the family is divided." (Mon. Culic., iv., 122, 1907.) We are aware of instances where the work of enthusiastic students has been completely arrested from their inability to make any headway in classifying their material, since they could never determine to what genera their specimens should be referred.

The practice has become prevalent of erecting genera not only on trivial characters, but hastily and without proper comparison of allied forms. For example, *Stethomyia*, Theobald, a genus of Anophelines, has been founded upon the so called mammillated prothoracic lobes. We have received authentic specimens of this species through the kindness of Dr. Oswaldo Cruz, and find that, firstly, Theobald's picture gives an altogether exaggerated idea of the structure, while, secondly, the same structure occurs in all the other species of *Anopheles* that we have examined.

The scales on the metanotum are another character which has given rise to error. The subfamily Trichoprosoponina has been founded upon the presence of scales together with setæ on the metanotum. The genus *Sabethes (sensu Theobaldi)*, however, which has the metanotum densely covered with scales in all the species which we have examined, is excluded. The presence or absence of scales is of no fundamental importance; their value is far less than that of the setæ. Practically their use is confusing, since in indifferent specimens they may be entirely rubbed off, leaving no trace, and causing the student to misidentify his material, if not to actually found a new genus.

We have elsewhere called attention to the fact that the so-called ciliate legs do not form a tangible character for generic separation. In the forms of *Janthinosoma* we find all degrees of intergradation between strongly "ciliate" hind legs and those with the vestiture smooth. A similar condition obtains in the species of *Psorophora*. Even more striking cases may be found in the group Sabethini; the genus *Lesticocampa* includes species with strongly "ciliate" legs, and with perfectly normal ones. The genus *Trichoprosopon*, Theob, was founded upon the species *nivipes*, Theob., in which the legs are not "ciliate"; Dr. Lutz has described a species from Brazil *(splendens)* with strongly "ciliate" legs, but has wisely refrained from proposing a new generic term.

Another character made use of by Theobald in his recent work proves to be untenable for generic separation. We refer to the so-called spiny front margin of the wings. This consists of a series of more or less spine-like scales inserted on the front margin of the wing. These may be more or less conspicuous, not only from differences in development, but according to the degree in which these scales are overlapped by the other normally-shaped scales. At all events, it offers nothing tangible or definable, being present more or less in all species.

The incorrect use of the term metatarsus has been corrected by Mr. Theobald in his latest volume, but, unfortunately, not uniformly so, so that the reader is often at a loss to know to which joint a certain number refers, thus greatly increasing the difficulty of this already too much involved subject.

We regret to be obliged to call attention to an important error in the otherwise excellent work of Dr. Goeldi. That author figures the eggs of *Mansonia titillans* from photographs. This constitutes the only reference published to the life-history of this interesting species, and is the only contribution to the life-history of it or its allies. Dr. Goeldi's observations have been widely quoted, and it is generally supposed, in consequence, that *Mansonia* eggs are of fusiform shape and deposited singly. It is, however, clearly to be seen from the figures of the adult on Dr. Goeldi's plate, that the species he had under observation could not have been a *Mansonia*, owing to the long tapering extensile abdomen there clearly shown, characteristic of *Ædes (sensu nostrum)*, while the abdomen of *Mansonia titillans* is blunt and non-extensile. This type of egg is also characteristic of *Ædes*, and leaves the early history of *Mansonia* entirely unknown. We have reason to suspect that the larvæ of this group, when known, will be found generally similar to those of *Tæniorhynchus (sensu Theobaldi)*, that is, they probably feed permanently in mud at the bottom of swamps, attached to air-bearing roots, and the eggs are probably laid in a boat-shaped mass.

Finally, we must notice *Anopheles perplexens*, Ludlow, recently described as from Pennsylvania. We decline to recognize this as an American species, since it is unreasonable to suppose such a form would have remained undiscovered, whereas the chance of its being of foreign origin is probable. The North American species of Anophelines are few and of generally wide distribution, whereas those of the Philippines are many, nor are the species there at all well known, nor their range of variation properly studied. Miss Ludlow receives frequent consignments of mosquitoes from the army surgeons, not only in the United States, but more frequently from the Philippines. Her method of keeping them in uniform pill-boxes, loose in cotton, with the data written upon the covers, lends itself easily to error, from the facility with which covers might be accidentally transposed without the change being suspected.

NOTES ON THE PTEROPHORIDÆ OR PLUME-MOTHS OF SOUTHERN CALIFORNIA, WITH DESCRIPTIONS OF NEW SPECIES.

BY FORDYCE GRINNELL, JR., PASADENA, CALIF.

Lord Walsingham's paper, "Pterophoridæ of California and Oregon," published in London, England, in 1880, is the first to describe or record any Plume-moths from California. It is devoted to those collected by the author in a journey through California and Oregon in 1871 and 1872. This was, and is, a notable contribution to Californian lepidopterology, and will hold its place in the future as a classic in the study of this interesting group of moths. Its descriptions are excellent, and its three plates well executed. Zeller in 1874 published a paper called "Lepidoptera der Westküste Amerika's," in which he describes *Leioptilus Mathewianus* from Vancouver Island. Charles Fish was the next person to describe any Plume-moths from California; this he did in a paper published in the CANADIAN ENTOMOLOGIST, in 1881, the specimens being mostly collected by Baron in Mendocino County. Since this last paper nothing has been recorded or described concerning these moths from California, except one species in Dyar's "List of North American Lepidoptera," 1902; this last work is important, as giving the synonymy and range of each species. Fernald, in 1898, published his valuable "Pterophoridæ of North America," reviewing the structure and literature, and describing all the species and genera with keys, and adding a few species from California without definite localities; this is the most important work on the Pterophoridæ of North America, and in the matter of genera and arrangement I follow it closely in the present paper.

It is seen that no species of Plume-moths have been definitely reported from Southern California; but the present paper shows them to be not at all rare, and that we have a good fauna, as we have of everything else. Doubtless many more species will be discovered with search and study.

Most of the material for this paper was collected at the headwaters of the Santa Ana River, in the San Bernardino Mountains, Southern California, by Prof. Joseph Grinnell, during the summer of 1907; and it shows the number of species to be taken in a rather small circumscribed area. A few species have been taken at San Diego by Mr. Wm. S. Wright, to whom I am indebted for sending them to me. Mr. Francis X. Williams has collected two new species near San Francisco, and raised them from the larvæ. A few have been collected at Pasadena and Stanford University by the writer.

Trichoptilus Wrightii, n. sp.—Expanse of wings, 16 mm. Head and thorax cinnamon-rufous; antennæ brownish-black, barred with white hairs; palpi cinnamon, tipped with white, and with long hairs underneath. Eyes dark brown. Thorax and abdomen cinnamon-rufous, whitish underneath; legs of the prevailing colour, spurs white, brown at base and at tip. Fore wings: cinnamon-rufous, with a tinge of orange towards the base of wings. Wings long, slender and narrow, giving the insect a delicate appearance. A light brown band crosses the outer third of the first lobe, between this and apex there is a darker patch, and in the apex there is a long, narrow, white patch resting on the costa, below which is a black streak in the fringe of the inner margin; the second lobe has a small, white spot in the anal angle, within which the fringe of long hairs is black. The feathers of the hind wings are of the general colour, as noted above, with the fringes darker and with a few black hairs intermixed; the third feather has the usual cluster of black scales towards the outer half.

Habitat: San Diego, Calif., Oct. 13, 1907; collected by Mr. Wm. S. Wright, in honour of whom this interesting species is named. There are five specimens in my collection, collected on the above date, two of which are types.

Oxyptilus Bernardinus, n. sp.—Expanse of wings, 18–22 mm. General colour of head, thorax, abdomen, legs and wings light mummy-brown (Ridgway's Nomenclature of Colours); antennæ narrowly-ringed with white throughout, the enlarged first joint conspicuously so; palpi largely white, with long fringes of white hairs on the segments.

Fore wings fissured to the middle; general colour mummy-brown, white as follows: Two oblique stripes on the outer end of the first lobe, the outer stripe narrow, the inner one at least twice as broad; a narrow white bar at end of fissure, reaching half way towards costa; the second lobe of a general, uniform colour, the anal angle very pronounced, white, producing the effect of an excavation, a few white scales along inner margin; under side much the same as upper, with white fringe of second lobe more pronounced. Hind wings general colour of fore wings, slightly darker; third lobe with a large cluster of black scales towards the apex, the fringe between the cluster and base whitish; hairs of fringes slightly blackish. The legs are mummy-brown, conspicuously barred with white. The spurs are brown on the under side, white above, long. Thorax and abdomen mummy-brown, sprinkled lightly with white hairs; base of thorax conspicuously white; abdomen with narrow white stripes between the segments.

Habitat: South Fork, Santa Ana River, San Bernardino Mts., Calif., 6,200 ft. altitude, June 27 and 28, 1907; described from five specimens, two of which are types in the author's collection.

This species is related to *O. ningoris*, Wlsm., from Northern California and Southern Oregon.

There is a single specimen from the Santa Ana River, 5,500 ft. altitude, Aug. 8, 1907. Expanse, 20 mm. General colour russet, thus being very much lighter than *Bernardinus*; the white stripes on the first lobe of the fore wings are very indistinct, the outermost almost obliterated; the white bar at the fissure scarely perceptible. A few black hairs on the fringe of the second lobe. The feathers of the hind wing are as dark, or nearly so, as *Bernardinus*. The thorax and abdomen russet; the white patch at base of thorax very conspicuous. I consider this specimen to be either a seasonal or altitudinal form, or probably both (note the date and altitude above). I propose to call this form *finitimus*, n. form.

Platyptilia Williamsii, n. sp.—Expanse of wings, 20.5 mm. Antennæ, palpi and head, wood-brown; thorax and abdomen wood-brown, conspicuously marked with hoary scales or hairs, especially dorsally, where it is quite white. Legs white, with conspicuous black bars; spurs white and of equal length.

Fore wings are generally fawn-colour, with traces of wood-brown and russet. Fringes light brown. First lobe: The outer third consists of a cinereous band, within this a wood-brown band, broader than the first band; within this is a dark mummy-brown triangular patch, the point resting on the end of the fissure, the costal side and side parallel with the outer margin, longest. A costal light mummy-brown streak extending half way to base. The outer cinereous band (marginal) continuous with that on first lobe; a line of black dots within the fringe of the inner side, the outermost small and isolated, the second longer. Rest of lobe of general uniform colour. The whole wing covered with glistening whitish scales. Hind wings of an even, pale fawn colour. The black scales along the fringe of third feather to more than half the distance from base to apex, numerous and crowded. Under side with a black outer margin; a white line on the outer side of the cinereous band, which is much paler above, more cinereous; a white dash on the costa above the fissure; a black spot at end of fissure.

Habitat: Lake Merced, San Mateo Co., Calif., May 31, 1907, F. X. Williams. Raised from larva found in head of a composite flower. Named in honour of my friend and fellow-collector, Mr. Francis Xavier Williams, of San Francisco.

This species is related to *albidorsella*, *grandis* and *Cooleyi*, from which it can be separated by its darker colour and smaller size.

Type: 1 ♂, in the author's collection.

Platyptilia monticola, n. sp.—Expands, 18–21 mm. Head and thorax fawn-colour; antennæ of an even colour, somewhat darker; abdomen a dark fawn-colour, with patches of hoary scales on the sides and dorsum and on the caudal end of the thorax. Legs light fawn-colour, spurs and adjacent parts of legs brownish, tips of spurs lighter.

Fore wings: Fawn-colour and salmon-buff. A dark triangular patch at end of fissure, resting on costa and apex reaching into second lobe, beyond the end of fissure; the outer side of triangle concave; between the triangle and the outer side is a dark patch extending between the two margins, repeated on the second lobe; on the outer side of this patch is a distinct, white line. The rest of the fore wing is fawn-colour, more or less mixed with black and hoary scales, except for a very conspicuous patch of black scales on the inner margin of second lobe, three-fourths of the distance from the base, and more or less triangular in outline. Fringes white. Feathers of hind wings very dark fawn-colour, scattered over with many darker scales and a few hoary ones. A few black scales towards the base of hind margin of the third feather, reaching in some specimens to a little beyond the middle of the feather.

Habitat: South Fork, Santa Ana River, 6,200 ft. altitude, June 26 and July 1, 1907, J. Grinnell.

Types: Four examples in the collection of the author.

Platyptilia hesperis, n. sp.—Expanse of wings, 26 mm. Head and thorax ochraceous to ochraceous-buff; eyes dark brown; antennæ light ochraceous-buff or buff, with a few lighter coloured hairs along the upper side; the abdomen, cephalad, is the same colour as adjacent parts of body, caudad it is mummy-brown to Prout's-brown, slightly lighter beneath and at the tip.

Fore wings: General colour varying from ochraceous-buff to ochraceous, and tawny-ochraceous in some lights, and clay-colour including the hind wings. A large, triangular patch of mummy- or Prout's-brown resting on the costa, one-third of the way from the base, the tip reaching to beyond the end of the fissure, not quite touching, a short distance, nearly half way into the second lobe; basally, the wing is ochraceous-buff; the part beyond the triangle has a central patch of ochraceous, edged with buff bands; next to the inner buff band, which is narrower, is a band of ochraceous, followed by a marginal band of mummy-brown ; the markings of the first continued on the second lobe ; fringes white ; the fringe of the inner margin of the second lobe has two patches of black scales, the basal one largest ; anal angle of the second lobe is mummy-brown, less so on the first lobe ; the apex of the first lobe is produced, pointed. Hind wings are entirely clay-colour, fringes slightly lighter ; third feather with black scales along the fringe, especially towards the base, the largest patch in the centre and somewhat triangular. Legs barred with mummy-brown and white, the basal part white ; spurs white.

Habitat : South Fork, Santa Ana River, 6,200 ft. altitude, June 26, 28, and July 1, and Santa Ana River, 5,500 ft. altitude, Aug. 3, 1907; San Bernardino Mountains, Calif., J. Grinnell. Described from five specimens, two of which are types in the author's collection.

Platyptilia Pasadenensis, n. sp.—Expanse of wings, 18 mm. Head and thorax light brown ; antennæ darker, spotted on the upper side with a lighter colour ; abdomen hair-brown, lighter beneath, and with patches of white scales, two large patches of white scales just below and slightly behind the wings ; on sides of the thorax slightly spotted with white ; legs dark brown, barred with white ; spurs pale, outer two-thirds dark brown.

Fore wings : General colour hair-brown to olive and seal-brown ; the darkest is a triangular patch, resting on the costa, above the fissure, not quite reaching the fissure ; the space between the triangular patch and outer margin is more or less hoary, but much streaked and spotted with black ; a narrow, fimbriate, obscure black line extends from the outer end of the triangle along the costa to within the fringes, thence to fissure, fading out on the second lobe. The wing within the triangular patch to base is darker than the outer half, and spotted with darker scales ; another blackish triangular patch rests on the costa at end of fissure, the longest side within ; a black quadrangular patch on second lobe, below the fissure ; the space between the two patches is light brown. Hind wings are the same colour as fore wings, with the usual black scales along the fringe of the third feather.

Habitat : Pasadena, Los Angeles Co., Calif. ; collected by the author, July 16, 1906.

Type : 1 ♂ in the author's collection.

Pterophorus baccharides, n. sp.—Expanse of wings, 30–36 mm. Antennæ and palpi whitish or clay-colour ; rest of head ochraceous ; thorax and abdomen buff ; legs buff.

Fore wings an even ochraceous-buff, inclining to light ochraceous along the costa, especially basally. Fringes darker than the adjoining parts of the wing. Colour glistening under a lens; the fissure occupies about one-third of the wing. Lobes of hind wing very light buff, with a silky lustre; fringes darker. The under side of all wings decidedly lighter than upper side, with a less silky appearance, a duller lustre, but bright.

Habitat: San Francisco, Calif., Sept. 7, 1907, Francis X. Williams. Raised from larvæ living in *Baccharis pilularis*, D. C.

Types: 1 ♂, 1 ♀ in the author's collection.

Pterophorus Gorgoniensis, n. sp.—Expanse of wings, 23–26 mm. Head and palpi grayish-white; antennæ grayish, distinctly annulated with black. Eyes blackish. Thorax and abdomen grayish-white; legs entirely grayish-white, spurs tipped with black.

General colour of wings buff to pinkish-buff, mixed with considerable grayish and black scales; a delicate, brownish-metallic lustre underlies the general colour of fore wings; there is a black dash on the costa above the end of the fissure, and two black dots between this and apex, indistinct; a black dot in the anal angle of the first lobe; fringes white, intermixed with a few black hairs; a small black, triangular spot at the end of the fissure. Hind wings even, shining, brownish, with a slight silky lustre; fringes concolorous.

Habitat: Santa Ana River, 5,500 ft. altitude, San Bernardino Mts, Calif. (J. Grinnell), Aug. 4, 8, 1907. There is a single specimen from the same locality, July 29, 1907, which differs in being much more brown over the whole surface, the black markings more conspicuous, and the triangular patch at the end of the fissure much larger.

Pterophorus subochraceus australis, n. subsp.—Expanse of wings, 28–30 mm. Resembles *subochraceus*, Wlsm., except that the general colour is cream-buff, even, with no other markings, except the abdomen, which is brownish above and below. There is no ferruginous shade on the fore wings, nor the cilia brownish, as described for *subochraceus* by Walsingham.

Habitat: Santa Ana River, San Bernardino Mts, 5,500 ft. altitude, July 25, 26, 29, and Aug, 13, 1907, J. Grinnell. Six specimens.

My six specimens are all constant, and I think the differences warrant giving it a distinct name. These little moths are very restricted in time and place of appearance, and their limited powers of flight render them restricted to certain localities. We should thus study them closely to observe the differences, and so arrive at a conclusion in regard to their origin and distribution.

Pterophorus Behrii, n. sp.—Expanse of wings, 26–30 mm. Antennæ grayish or whitish, conspicuously barred with black rings the whole length; eyes brownish; head and palpi grayish, tip of palpi black; thorax and abdomen grayish; legs gray, conspicuously barred with black at the joints; spurs white.

Fore wings: General colour grayish, but much streaked and blotched with black and white or grayish. Three black blotches on the costa of the outer half of the first lobe; a white, orbicular blotch at end of fissure, followed inwardly by a black dash, which is somewhat long-triangular in outline; a black dash on the outer third of the first lobe, next to the fissure; on the second lobe there is a black dash in the apex and one in the inner margin; the rest of the wing is grayish, conspicuously dotted with black; there is a round, white, black spot on the inner side, one-third the distance from base, and a white dash on the costa of the first lobe. Fringes fuscous, marked or streaked with white. Hind wings fawn-colour, shining, fringes concolorous, long.

Habitat: Santa Ana River, 5,500 ft. altitude, July 26, Aug. 3, 1907, San Bernardino Mts., Calif., J. Grinnell. Six specimens, two of which are types, in the author's collection.

A very pretty species allied to *grisescens*, Wlsm., and *aretidactylus*, Fitch. Dedicated to the memory of Hans Herman Behr.

Pterophorus Catalinæ, n. sp.—Expanse of wings, 28 mm. Head and thorax and palpi cream-buff; antennæ cream-buff, darker at the tip; eyes dark brown or black; abdomen cream-buff, brownish dorsally; legs and spurs white.

General colour of wings cream-buff to olive-buff; first lobe of fore wings entirely clear olive-buff, except the fringes, which are lighter and comparatively long; the second lobe is cream-buff, slightly tinged with olive at the base; fringes very long, somewhat lighter, especially on the outer half of the wing at anal angle. Hind wings pale ecru-drab, shining, fringes concolorous; fringe very long, especially along the inner side of the third feather.

Habitat: Avalon, Santa Catalina Id., Calif., Sept. 6, 1907, collected by Mr. Victor L. Clèmence. Described from one specimen in the author's collection.

This is a very distinct and peculiar-looking species, the pronounced curve to the first lobe of the fore wings, and the general slender aspect, render it easily recognizable and distinct. It is interesting as coming from an island.

Pterophorus Hilda, n. sp.—Expanse of wings, 23 mm. Head and antennæ pinkish-buff; antennæ annulated with black; eyes black; thorax and abdomen pinkish-buff or cream-buff.

General colour of wings varying from pinkish-buff, cream-buff to olive-buff; there is a black dash at end of fissure, but not touching it, somewhat crescent-shaped; a delicate shade (white) extends from here to the costa, slightly diagonally, where there is another dark brownish dash resting on the costa lengthwise; there are indications of two or three more spots between this and apex, obscure; there is a delicate white shade along the costa of the first lobe, and in the apex is a larger one, with a white line extending from this to the anal angle; the second lobe is of the same general shade of colour, but is more largely intermixed with a white shade, which in the outer half (in one specimen) is resolved into three bands. Fringes white, mixed with black hairs. Hind wings of an even, shining pinkish-buff; fringes long, concolorous; legs white.

Habitat: Santa Ana River, 5,500 ft. altitude, July 27 and 31, 1907, J. Grinnell. San Bernardino Mountains, Calif., July 13, 14, and Aug. 3. Five specimens, of which two are types in the author's collection.

Named after Hilda Wood Grinnell, who took so much interest in the Lepidoptera of the San Bernardino Mountains.

Pterophorus pictipennis, n. sp.—Expanse of wings, 26 mm. Head and antennæ cream-buff; eyes black; rear of head, thorax and abdomen ochraceous-buff; legs whitish, barred with ochraceous-buff.

General colour of fore wings ochraceous-buff, with on admixture of salmon-buff; a black dash at base of fissure; four or five small black dots in angle of second lobe, and several along the inner margin, not reaching the base; fringes darker than the rest of the wing. Hind wings salmon-buff, with shining scales and silky lustre; fringes of all the feathers very long, opaque, concolorous. Legs salmon-buff and ochraceous-buff, spurs white on the basal half, the upper part white.

Habitat: South Fork of the Santa Ana River, 6,200 ft. altitude, San Bernardino Mts., Calif., June 29, 1907; J. Grinnell.

Type in the author's collection.

Another specimen which is not quite typical is placed here provisionally; it is from the Santa Ana River, 5,500 ft. altitude, July 26, 1907.

It is less bright in its coloration, the first lobe being a grayish-brown to the base of the wing.

Stenoptilia Coloradensis, Fernald.—Fernald, Pterophoridæ of North America, p. 61, 1898. (Four examples from Colorado.)

I have seventeen specimens in my collection from Santa Ana River, 5,500 ft. altitude, July and August, 1907, and South Fork, 6,200 ft. alt., June 19, 25, 1907, in the San Bernardino Mts., Calif.; J. Grinnell. Not previously reported from any locality, except the type locality.

Stenoptilia Californica, n. sp.—Expanse of wings, 28 mm. General colour buff to ochraceous-buff. Head, palpi and antennæ of an even buff.

Fore wing with a heavy, comparatively large, tawny dash at the base of fissure, barely touching the fissure, extending to the costa in a broad, diagonal, somewhat lighter shade; this band directed costo-apically; the costal end of the band is a very heavy tawny dash. The rest of the wing an even general colour, buff-ochraceous, except the apex of the first lobe, which is somewhat darker. The hind wings are an even colour, but lighter than the fore wings, of a silky lustre; fringes concolorous. Under side similar to the upper, but lacking the dash and streak on the first lobe of fore wings. Thorax and abdomen the same colour as adjacent parts of the wings.

Habitat: Santa Ana River, 5,500 ft. altitude, Aug. 2, 18, 29; South Fork, 6,200 ft. altitude, July 10, 1907, San Bernardino Mts., by J. Grinnell, and Pasadena, Los Angeles Co., Calif., Aug. 24, 1907, collected by the author. A very beautiful species.

Stenoptilia Gorgoniensis, n. sp.—Expanse of wings, 24–26 mm. Head and palpi light salmon-buff; antennæ darker, inclining to cinnamon-rufous.

General colour of wings salmon-buff, darkest toward the costa; this colour is fairly even over the fore wings, except that the costal region, especially basally, is very much darker; the fringes are lighter, and there is a darker, fimbriate, marginal line, inconspicuous; a conspicuous, dark brown dash, basad of the fissure, and somewhat below it; there is a small, black dot in the anal angle of the second lobe. The hind wings are practically of the same even colour as the fore wings, and also the fringes, with a silky lustre. The under side is somewhat lighter, slightly suffused with grayish scales, and lacks the black dash on the fore wings. Thorax and abdomen light salmon-buff; legs and spurs grayish-white.

Habitat: South Fork, Santa Ana River, 6,200 ft. altitude, San Bernardino Mts., Calif., J. Grinnell, July 4, 1907. Described from two examples, taken within the San Gorgonio quadrangle (U. S. Geological Survey). Types in the author's collection.

NEW PHILANTHID WASPS.

BY S. A. ROHWER, BOULDER, COLO.

Cerceris calochorti, n. sp.—♀. Length, about 10 mm.; length of anterior wing 7 mm. Head with rather large, separated punctures; closest anteriorly, where they are somewhat confluent; ocelli in a low triangle, the distance between the two lateral ocelli less than the distance to the nearest eye margin; between the antennæ is a low, broad carina, which goes to base of the clypeus; first joint of flagellum about equal to 2 + 3; flagellum somewhat thickened from base to apex; clypeus distinctly convex in middle, convex part truncate, without any teeth; pronotum rounded, without ridge anteriorly, and not broken in middle, with a few well-separated punctures; propleura with irregular striæ; dorsulum with distinct punctures, some well separated, others touching each other, a broad, shallow furrow down middle; scutellum similarly punctured; mesopleura punctured similarly, but the punctures more shallow; mesopectus in middle without punctures; metathorax more shining than dorsulum, and the punctures are larger; enclosure dull, at anterior angles with four or five oblique striæ, rest very finely, longitudinally striated, middle furrow distinct but not strong; apical angles of fore tarsi rather strongly produced; posterior coxæ distinctly, strongly excavated on outer margin; posterior tibiæ serrate on outer margin; first abdominal segment small; all the abdominal segments somewhat constricted at base above, punctures of dorsal segments large (larger on first three segments), well separated; punctures of the ventral segments are not as strong as those of the dorsal; pygidium distinctly margined, about twice as long as width at base, obtusely rounded, densely punctured (punctures confluent). Colour black, subopaque basal part of mandibles, clypeus, except narrow line on apical middle and thin black line separating sides and raised part at base, lower two-thirds of inner orbits broadly (this is separated from the clypeus by a thin dark line), carina between antennæ to clypeus, scape in front, spot back of eyes near vertex, *yellowish white;* two large spots on pronotum, tegulæ, small spot below tegulæ, line on scutellum, postscutellum, two large oval spots on metathorax, large spots on first abdominal segment nearly meeting in middle, broad band on second to sixth (this band is narrowed in the middle on the second, third, fourth segments), spots on second, third, fourth and fifth ventral segments (those on second and third uniting in middle), *lemon-yellow;* legs, coxæ, trochanters, basal half of four anterior femora above, apex of posterior femora (deeper above), apex of posterior tibiæ, *black*; tarsi somewhat ferruginous, rest of legs *lemon-yellow;* wings dusky hyaline, darker at anterior apical margin; nervures brown, costa and stigma reddish-yellow; flagellum bright ferruginous beneath, dark brown above; a few white hairs on head and thorax.

Habitat.—Boulder, Colorado, June 27, 1905 (W. P. Cockerell), fls. of mariposa lily *(Calochortus Gunnisonii).*

This could hardly be the female of *sexta*, Say, as it is much smaller. It differs as follows from Cresson's description (Philanthidæ of N. Am.): flagellum ferruginous beneath for entire length; enclosure dull, not shining; nervures brown, not ferruginous. It is near *vicinoides*, Vier. & Ckll., but may be separated by not having the mesopleura reticulated, the enclosure striated at sides, posterior femora mostly yellow, and other characters.

Two ♂'s from Boulder, Colo. (W. P. Cockerell), are probably males of this species. In one the markings are whitish-yellow, not lemon-yellow. In both the metathoracic enclosure is finely striated with broken striæ, and the face has more yellow, as is usual for the males of Philanthidæ.

Cerceris solidaginis, n. sp.—♂. Length, 10 mm. Head nearly as wide as the thorax, closely punctured with large punctures; width of the front below the antennæ less than the length of the eyes; ocelli in a low triangle, distance between the lateral ocelli less than the distance to the nearest eye margin; high sharp carina between the antennæ; third joint of antennæ a little longer than fourth; clypeus punctured as front, produced into a large triangular tooth anteriorly; dorsulum with large punctures, punctures closest at the sides; scutellum punctured like dorsulum; mesopleura and pectus closely punctured with large punctures; metathorax with large, close punctures, punctures running into the enclosure, so it is almost wanting; posterior tibiæ with teeth on the outer margin; first joint of hind tarsi equal to 2 + 3 + 4; dorsulum of abdomen with close, large punctures; apical segment longer than wide, margined at the side, at the apex with two short spines; venter of abdomen shining, with a few sparse punctures, a comb of long blackish hairs between apex and middle of each segment. Colour black; antennæ brown, paler at base; mandibles (apex piceous), clypeus, except narrow black border, face to a little above the level of the antennæ except around the antennæ, two elongate spots on pronotum; tegulæ, two spots on scutellum, postscutellum, four anterior legs below femora, dorsal segments 2–7 except at base (wider in the midde of three, four, five and six), *lemon-yellow;* four anterior trochanters and femora, posterior legs below coxæ ferruginous, or *reddish-yellow;* wings subhyaline, marginal cell and surrounding area somewhat fuscous ; venation pale brown, stigma and costa reddish-yellow ; anterior margin of clypeus with a fringe of silvery hairs ; thorax and abdomen above with few scattered hairs.

Habitat.—Las Cruces, N. M., Aug. 3 (C. T. H. Townsend), fls. of *Solidago Canadensis*.

This species is near *femur-vibrum*, Vier. and Ckll., but the enclosure of the metathorax is punctured with large punctures, not smooth in the middle ; the metathorax is without spots, etc.

Cerceris argyrotricha, n. sp.—♀. Length, 11 mm. Head as wide as thorax, rather closely punctured with large punctures ; facial quadrangle broader than long ; distance between the eyes at antennæ greater than the length of the eyes ; ocelli in a low triangle, distance between the lateral ones about equal to the distance of the nearest eye margin; carina between the antennæ prominent ; third joint of antennæ about equal in length to fourth ; clypeus punctured like front, anterior margin with two very small teeth ; thorax, except enclosure, with large rather close punctures ; enclosure closely, finely punctured, middle furrow distinct, four anterior femora rather robust ; anterior tarsi on outside with long bristles, on inside with a comb of short hairs ; posterior tibiæ on outer margin strongly serrate ; first joint of posterior tarsi a little longer than 2 + 3 + 4 ; dorsal segments of abdomen coarsely, closely punctured, punctures on first two segments larger ; ventral segment with very few punctures ; pygidium about three times as long as the width at base, at apex truncate, closely, finely punctured. Colour ferruginous ; apex of mandibles, apical half of antennæ, front above antennæ (except two ferruginous spots on superior orbits), a basal, triangular spot on dorsal abdominal segments three and four (this spot is dark brown), *black ;* clypeus, face to a little above the level of antennæ, elongate spots, pronotum, postscutellum, broad band on second dorsal segment, and following dorsal segment, except spots above mentioned, tegulæ in part, *yellow ;* wings subhyaline, darker along margin ; venation brown, stigma yellowish ; face in front, thorax beneath, legs, especially tarsi, and more especially the hind tarsi, with silvery pubescence.

Habitat.—Las Cruces, N. M., Aug. 11 (C. T. H. Townsend).

This is quite a distinct species. In Viereck's and Cockerell's table of New Mexico Cerceris (Jn. N. Y. Ent. Soc., Sept., 1904), it runs out at 7 because of the yellow clypeus and truncate pygidium.

Cerceris rhois, n. sp.—♂. Length, 12 mm.; length of anterior wing, 10 mm. Head closely punctured with large punctures; ocelli in a triangle, distance between the lateral ocelli less than that to the nearest eye margin; carina between the antennæ short, high, sharp; third antennal joint longer than fourth, first and third joint of about equal length; clypeus punctured as front, produced in the middle into a short, broad tooth, which at the apex is dentate; thorax, except enclosure, punctured like head, mesonotum in middle with a shallow longitudinal furrow in anterior middle; enclosure strongly, slightly obliquely striated, middle furrow distinct, on the lower part the striæ start from this furrow; posterior tibiæ on outer margin with six short teeth, from each tooth is a rather long bristle; abdomen above with large, rather close punctures; venter shining, not strongly punctured, first ventral segment rather finely striato-punctate; seventh dorsal segment parallel-sided, not quite twice as long as width at apex, rather sparsely covered with large punctures, at apex truncate, a small tooth at each apical corner. Colour black; clypeus, mandibles (apex piceous), face to a little above the antennæ, two spots on pronotum, postscutellum, broad band on second dorsal segment, a narrower one on following dorsal ones narrowed in middle, narrow band on ventral segments two, three and four, anterior trochanters and femora beneath, middle and posterior coxæ beneath, entire middle and posterior trochanters, middle femora beneath, posterior femora for basal half, four anterior tibiæ and tarsi, *yellow*; four basal joints of antennæ, apical half of middle femora above (the basal half above black), apical half of posterior femora, posterior tibiæ and tarsi, tegulæ, *reddish-yellow*; wings subhyaline, apex clouded; venation reddish-yellow; entire insect clothed with brown or golden pubescence.

Habitat.—Rio Ruidoso, White Mts., about 6.500 ft., N. M., July 21, on flowers of *Rhus glabra* (C. T. H. Townsend).

In the striation of the enclosure this species is like *C. compacta*, Cress., but the clypeus is different, also the pubescence. There are also other differences. It has some resemblance to *mimica*, Cress, but is of a different colour, the venter is maculated, etc.

Cerceris cleomæ, n. sp.—♂. Length, about 5 mm. Head with large close punctures; distance between the lateral ocelli about equal to the distance to the nearest eye margin; carina between the antennæ rather strong; first antennal joint longer than third, third and fourth equal; clypeus punctured like front, rather pointed in middle of rounded anterior margin; entire thorax punctured with large close punctures; enclosure with large punctures, middle furrow more or less distinctly indicated by a row of punctures; four anterior femora robust, swollen; anterior trochanters triangular in outline, long, as long as half their femora; abdomen above punctured as thorax; venter not strongly punctured; seventh dorsal segment parallel sided, about twice as long as the width at base, truncate at apex, each apical corner with a small tooth, punctured with large punctures. Colour black; antennæ, except basal joints above, fulvous, dusky above; face to level of antennæ, inner orbits to a little above antennæ, middle of clypeus, outer half of tegulæ, postscutellum, *yellow;* bands on dorsal abdominal segments two to seven (one on sixth very small), *yellowish-white;* legs below knees (posterior tibiæ at apex brownish) yellow or reddish-yellow; posterior trochanters and base of femora rufous; posterior femora dark brown; wings dark, darker along anterior margin; venation black.

Habitat.—Denver, Colo., July 20, 1907, on Cleome, 1109 (Dunning).

The coarsely-punctured enclosure separates this species from most American ones. From its allies the dark wings, small size and shape of the clypeus will serve to separate it. The general appearance is much like that of *C. finitima*, Cresson.

The types of the species described above are in the author's collection. The following species of *Eucerceris* has been described by Mr. Cockerell, after we had studied and discussed it together:

Eucerceris pimarum, n. sp., Cockerell & Rohwer.—♀. Length, about or nearly 10 mm.; red, blackish and pale yellow. Head broad and thick, bright ferruginous, darker on face; mandibles thick, black at apex; face flattened, closely and finely punctured; clypeus very short, but very broad, divided into three lobes, the middle one with a pair of rather widely separated black teeth or tubercles on the lower margin, and between them a small bituberculate prominence, and all three fringed with rather short pale hairs; front with a very prominent obtuse ridge between the antennæ, broadening and inclining to divide above, so as to form a sort of V; front, vertex and cheeks with strong, close punctures; vertex broad; interocellar area black; cheeks exceedingly broad, rounded behind; antennæ ferruginous, the apical two-thirds of the flagellum more dusky; third antennal joint little shorter than 4 + 5; mesothorax very shiny, with large, well-separated punctures, tending to run in rows; scutellum and postscutellum sparsely punctured; mesopleura roughened;

region beneath hind wings obliquely striate; metathorax closely punctured, the area triangular, strongly, transversely grooved, and with a longitudinal median groove; thorax ferruginous, the mesothorax blackish, suffused with red behind, the area of metathorax black or almost; prothorax above, scutellum anteriorly (narrowest in the middle), postscutellum, a patch on upper part of pleura, and an elongated mark on each side of metathorax, all pale yellow; tegulæ ferruginous; wings hyaline, with a slight cloud near upper end of basal nervure, and a very large dark brown cloud occupying the marginal cell, the apex of the first submarginal, the small second submarginal, the third submarginal except below, and the apical area beyond these; stigma clear orange-ferruginous, nervures fuscous; recurrent nervures received near beginning of second and third submarginal cells; legs bright ferruginous; hind tibiæ with strong but short spines on outer edge; abdomen constricted at the bases of the segments, shining, punctures strong and well separated, but segments 2 to 4 with a band of small dense punctures across the middle; first segment small; first four segments reddish-fuscous or reddish-black above, the others and the venter ferruginous; first five segments each with a broad apical pale yellow band, that on second very broad laterally, but widely emarginate in the middle; pygidial area broad, dull, subrugose.

In Cresson's table of *Eucerceris* this runs nearest to *E. fulvipes*, Cress., to which it is allied, but *fulvipes* has conspicuous light markings on the face, and honey-yellow nervures.

Hab.—Phœnix, Arizona, 1897, November. Collector unknown; received from Mr. S. N. Dunning.

A JULY BLIZZARD.

BY WM. H. BROADWELL, NEWARK, N. J.

My duties as a letter carrier necessitate my being out each night till 1 a.m., so I have a fine chance to observe the things that go on in the entomological world after sundown. As I pass several hundred electric lights in the suburbs, I see and get a large quantity of insects that I would not otherwise come across.

On the evening of July 17th the "blizzard" occurred. From about 8 p.m. until 2 a.m., by actual observation—and no doubt until daylight—there were around each electric light thousands, yes, millions, of a small white moth—*Ennomos subsignarius.*

In New York they were in evidence on the 15th, on the 16th in Paterson, and in Newark on the 17th. At all these places they were present in about the same abundance.

At an electric light two doors away from my house they covered a branch of a tree extending out over the street so thickly that, when standing at my door, the branch had the appearance it would have after a heavy fall of wet, clinging snow. On the front of the two houses nearest to this light, from the top of the first-floor windows to the roof—both three-story houses—you could not have placed your hand on the boards without disturbing four or five moths. There is an eight-foot alley between these houses, and the sides adjoining this alley were covered in the same manner.

When going along the streets and passing a light, one's clothing became coated as effectually as with real particles of snow. They would fly in one's face, in one's eyes, and into one's mouth if it were not kept tightly shut.

Early the following morning (the 18th), under the lamps the wings were on the ground as thick as apple blossoms after a storm, showing that the sparrows had not forgotten why they were brought over to this country some forty years ago. In New York they extended from Herald Square to Harlem. At Paterson and Newark they extended to all parts of the cities.

Although this moth was so abundant, it is as harmless as it is beautiful.

E. subsignarius feeds on only five or six varieties of trees, and except under the most unusual conditions could it do much harm. We may consider ourselves fortunate that the invasion was not of the Brown-tail or Gypsy moths. It would be a hard matter to say where this army of invaders came from, but no doubt conditions somewhere were favourable to their breeding to such an enormous extent.

In July, 1897 or 1898, I saw a similar phenomenon at Boonton, N. J., but in this case the invaders were *Nepytia semiclusaria*.

On the 4th of July I was in a large woods, and suddenly came to a tree completely covered from base to the lower limbs with *semiclusaria*, and upon going a little further I saw other trees covered as thickly. As in this latest instance the invasion was for only one day, the next day only a dozen or so could be found. Whence came they? Whither do they go? It is easy to answer the last, but who can explain the first?

NEW SESIID MOTHS.

BY T. D. A. COCKERELL, BOULDER, COLORADO.

Sesia fragariæ (Hy. Edw.), var. *semipræstans*, v. nov.

♀.—Length almost 12 mm.; anterior wing, 10⅓; antennæ simple, dark steel blue, with a dusky apical tuft; occiput, cheeks and palpi covered with orange-vermilion scales; last two joints of palpi with a few black scales; tongue long; vertex with black scales, and a little tuft of red on each side; a little red beneath each antennal socket; face convex, shining purple; thorax at sides orange, tinged with purplish-pink, above dark, with very strong peacock colours, green and purple, and rudimentary sublateral red stripes; patagia tipped with orange; legs metallic dark blue and green, with the tibiæ orange-vermilion, except at apex and base, and the tarsi also with many light orange scales; anterior wings metallic peacock-green, irrorated with pale reddish scales, but the lower margin, greatly widening basally, is a splendid orange, suffused with purple and crimson, while near the apical margin the dark scales are blackish; the discal red stripe is evident, but small; hind wings covered with orange scales, with only small transparent patches, these, perhaps, due to abrasion, veins M_3, Cu_1 and Cu_2 black-scaled; fringes very long, shining yellowish-plumbeous; abdomen dark peacock-green, with the fourth segment, and the hind margins of the two following, vermilion; caudal tuft vermilion, with a few dark hairs laterally; beneath, the abdomen is red laterally, and mainly dark in the middle.

Hab.—Florissant, Colorado, prox. 8,000 ft., June 21, 1908, flying rapidly over very dry and barren ground *(Cockerell)*.

Beutenmüller (Bull. Am. Mus. Nat. Hist., VIII., 144) remarks that *S. præstans* (from Washington State) is much like *fragariæ*, but "is larger, and is marked with orange in the cell and streaked with this colour in the area beyond the discal mark." In the orange streaking our insect is like *præstans*, but in the colour of the legs and the size it is like *fragariæ*. The colour of the abdomen is more like that of *præstans* than *fragariæ*. Henry Edwards, in his original description of *fragariæ*, omits all mention of the red fourth abdominal segment—a most conspicuous feature of *fragariæ*, as understood by Beutenmüller, who examined Edwards's type. Beutenmüller, however, says the type is "one female from Colorado," whereas Edwards describes the species primarily from a male.

It may be that *semipræstans* is a distinct species, but it seems better at present to treat it as a form of *fragariæ.*

In 1894 and 1896 Mr. Beutenmüller treated *Pyrrhotænia helianthi* as a synonym of *fragariæ*, but in his Monograph of the Sesiidæ, he makes it a synonym of *S. Behrensii* (Hy. Edw.). The name *helianthi*, however, has priority over *Behrensii*, and the species must be known as *Sesia helianthi* (Hy. Edw.).

Sesia florissantella, n. sp.

♂.—Length, 8 mm.; anterior wing about 5½; no red or yellow about the insect; antennæ black, with a small apical tuft; the basal half of the antennæ beneath is finely denticulate, and also furnished with numerous curving hairs; occiput with long, coarse, faintly yellowish hair; vertex with black hair or scales; cheeks with white hair, and face with white scales; palpi long and very bristly, the clothing black on the outside, white above and within; tongue slender; thorax above black, with strong greenish-metallic tints, the collar strongly brassy; sides of thorax with large black and white scales, a conspicuous patch of white just beneath the wings; legs black and white, the long hair on femora beneath white, spurs white, hind basitarsus nearly all white, as also second joint within and at apex, hind tibiæ with much white about the middle; anterior wings purple-black, with scattered white scales, a small white mark (peppered with black) in the cell, and conspicuous white streaks in the apical field; hind wings transparent pearly-white, except for the black costa and scales on the veins; fringes of both wings long and black; abdomen purple-black; some white scales on second segment; a narrow pure white band on fourth, and an apical white band on the penultimate one; caudal tuft black.

Hab.—Florissant, Colorado, June 25, 1908, in a very dry place (*Cockerell*). A distinct little species, in colour resembling *S. arctica*, Beutenm., as much as anything. It appears to be related most closely to *S. nigra*, Beutenm., known only in the female. It is barely possible that it is the undescribed male of *nigra*, but the differences in the colour of the wings are so great that this cannot be assumed.

Ægeria tibialis (Harris), var. *Dyari*, n. var.

♀.—Thorax purple-black; lateral bands in front very broad, but the longitudinal lines very narrow; posterior dorsal yellow spots very large; abdomen with first segment black; second black, narrowly yellow at base;

third yellow, narrowly black at apex ; fourth black, narrowly yellow at base ; fifth and sixth yellow, narrowly black at apex ; apex of abdomen cinnamon-brown.

Hab.—Las Vegas, New Mexico, July 3, 1900 (*Cockerell*). The same variety is figured in Beutenmüller's Monograph of the Sesiidæ, pl. xxxiii, fig. 13. The specimen figured, as I learn from Mr. Beutenmüller, is from Colorado. This variety was described many years ago, but not published ; my type is in the U. S. Nat. Museum.

MOSQUITO NOTES.—NO. 6. (Continued.)

BY C. S. LUDLOW, PH. D.

Laboratory of the Office of the Surgeon-General U. S. Army, Washington, D. C.

From the Philippines comes a well-marked mosquito, apparently belonging to Theobald's *Pseudo-uranotænia*, but having very broad ungues not mentioned in the description of the type.

Pseudo-uranotænia triangulata,, n. sp.—♂. Head dark, densely covered with white flat scales, having a bluish tinge and a few brown bristles ; antennæ light and apparently lacking pubescence, verticils brown, basal joint testaceous ; palpi brown, proboscis brown, some outstanding scales near the tip on one specimen, labellæ light, eyes brown and gold, clypeus dark brown.

Thorax : prothoracic lobes brown, with white, flat, broadly round-ended scales, a few brown bristles ; mesonotum brown, covered for the most part with slender brown curved scales, but with a band of flat, white, broadly " round-ended " scales running cephalad from the wing joints, and meeting at the nape, making a continuous line of bluish-white around the latero-cephalic edge of the mesonotum, many long brown bristles near the scutellum ; scutellum brown, markedly lobed, with flat brown scales and very long brown bristles ; pleura brown, with brown flat scales, shaped like those on the mesonotum, and a line of flat white scales running diagonally across ; metanotum brown.

Abdomen covered with black scales except a triangular apical spot (apex toward the base of the segment) of brilliant white scales, the spot sometimes extending to the base of the segment ; venter black, except a few white scales forming a median line.

Legs : coxæ and trochanters light, with brown scales. The remainder of the legs covered with brown scales except in the hind legs, which have the fourth and fifth and the distal half of the third joint pure white, mid femora markedly swollen. Ungues missing on all but the hind legs, where they are white, simple and very broad, rather leaf-like.

Wings clear, almost white, partly denuded, but with broad scales, some of them as symmetrical as in *Mansonia*, others suggesting the "heart-shaped" scales of *Etorleptiomyia*, mostly brown, but some white scales, an irregular white spot just exterior to the root of the third long. vein, and extending on the second long. and subcosta, but not on the costa, costal scales as in *Uranotænia*. The cells very short, first submarginal at least one-third shorter than, and not so wide as the second posterior cell; supernumerary and mid cross-vein about the same length, meeting at an angle, and the posterior cross-vein about one-half the length of, and three times its length distant, anteriorly, from the mid.

Length, 3.5–4 mm. Habitat: Reine Regente, Mindanao, P. I. Taken Feb.

The markings are distinctive, the triangular spots on the abdomen being very noticeable.

It seems probable that in *Pseudoskusea mediolineata*, mihi, I have inadvertently described Theobald's *Skusea mediofasciata*, the distinctien between the two genera being not the toothed ungues, but the long palpi.

ACKNOWLEDGMENT.

The Curator begs to acknowledge with grateful thanks the receipt of a box containing 87 specimens of Cuban Lepidoptera, Rhopalocera and Sphingidæ, sent by Mr. Charles T. Ramsden, Guantanamo, Cuba; they form a very welcome addition to the collections of the Entomological Society of Ontario.

NOTE.—The *Rhachidorus Semoni*, Krauss, Orth. Austr. and Malayischen Archip., p. 765, pl. LXVII, figs. 13, 13a-b (1902), from Queensland, was inadvertently omitted from my fascicula on the Decticinæ in Wytsman's Genera Insectorum, which has just appeared.

Too late for recording in the above-mentioned work, I find my *Platycleis Fletcheri*, described from a ♀ from Canada, belongs to the genus *Idionotus*, and is the same as my *I. brevipes*, described from an alcoholic ♂ from Arctic America. The discovery of this synonymy is due to Dr. E. M. Walker, of Ontario, who has taken both sexes of this insect. —A. N. CAUDELL, U. S. Nat. Museum, Washington, D. C.

ACTIAS LUNA.

I have been raising several broods of *Actias luna* this year. The prevailing type has very yellow-tinted males, a sort of golden-green, sometimes almost approaching sulphur-yellow, and some of them have the dark lines across the wings very pronounced and strongly undulated. The females are always clear green. I am trying to intensify these peculiarities by selecting the most marked examples to breed from, and as a complete generation requires only about seven to eight weeks during our long summers, results should be quickly attainable.

The species is easily raised in quantity, but is exceedingly rare out of doors. This seems to be due chiefly to the unremitting search for the caterpillars by the large paper-wasps (Polistes). Nothing can exceed the tiger-like ferocity with which these wasps leap upon and rip up and devour one of these great caterpillars—sometimes they bite holes in my cheese-cloth bags on the trees, and a veritable massacre of the innocents follows the entry of one of these murderous creatures. I have seen them tearing furiously with fore feet and jaws at the webs of the tent-caterpillars. They seem to track their prey by scent rather than sight.

A large Cecropia caterpillar put on a branch in the open escaped them for a day or two—Cecropia is not a native here—but very soon I came upon a wasp licking her chops over the last of it, while two examples of a smaller species of Polistes were chewing at the offal like jackals at a tiger's feast. The big wasp ignored them, but snapped viciously at a fly that came for a taste.

Last winter I sent to the CAN. ENT. a modest little advertisement of surplus Luna cocoons for sale. The outcome proves that this journal furnishes to its advertisers, besides sordid lucre, pretty nearly "everything that is requisite and necessary, as well for the body as for the soul," for I sold all my cocoons, and have had a most interesting correspondence and exchange of treasures. One boy in far-off Nova Scotia says I am to be his adopted "Uncle Teddy" henceforward as long as I live, and that he is coming some time to visit me in Florida !

Now, no one can ask more in this world than to have plenty of love and plenty of money (or its equivalent) and an agreeable avocation—the three together are surely "wealth beyond the dreams of avarice"—and all in return for a paltry half-inch of advertising space, at a money-cost too insignificant for consideration !—THEODORE L. MEAD, Oviedo, Fla.

BOOK NOTICES.

KIRKALDY'S CATALOGUE OF THE HEMIPTERA: A PRELIMINARY NOTE.

BY J. R. DE LA TORRE BUENO, WHITE PLAINS, N. Y.

I desire to bring to the notice of American entomologists, more especially to that of our hemipterists, Kirkaldy's Catalogue of the Hemiptera, which will shortly be published by F. L. Dames, of Berlin.

It has been my privilege to read some of the proof-sheets, and I am bound to say that in spite of all the discussion to which it will surely give rise, the work will be indispensable to all systematic zoologists, on account of the phylogenetic matter that enriches it. I reserve to myself the pleasure of going fully into the contents of each volume on its appearance. The first volume is promised to us shortly. But in the meantime I may say that it is far more than a mere list of names, since it gives much biological data and brings all synonymies down to date, clearing up many obscure points. I believe that since Stal's *Enumeratio Hemipterorum* no work of a similar nature has covered the field so completely, excepting, perhaps, Wytsman's "Genera Insectorum," which, however, is different in scope and plan.

THE GENERA OF THE TORTRICIDÆ AND THEIR TYPES. By C. H. Fernald, A. M., Ph. D., published by the author, Amherst, Mass. Signatures issued as dated February 21st to May 29th, 1908; issued complete June 4th, 1908; 68 pages.

The fathers of entomology who did such conspicuous work in the last quarter of the eighteenth and the first half of the nineteenth century, usually omitted to designate any certain species as the type of or typical of their genera. Their conception of a genus was also based upon superficial characters, such as the pattern and ornamentation of the wings, and it was naturally found, when the present systematic structural scheme was adopted, based upon venation and other fixed characters, that in many cases under one genus were many different structures.

This has been the cause of endless confusion and changing of generic names, especially during the past twenty-five years, when the systematists in different groups have endeavoured to live up to the severe letter of the law of priority. The confusion has been only increased by the different interpretations and different methods pursued by investigators as to the manner of fixation of types. Professor Fernald in this work states that he has followed the latest rules as prescribed by the highest International Authorities, and adopted at the last meeting of the Zoological Congress.

This work is the first of its kind that has ever been published in the Microlepidoptera. As its title implies, it takes up one by one every Tortricid genus known to the author, from the tenth edition of Linnæus down to the present day, and fixes and names the type species in each genus. The fact that about three hundred and twenty generic names are reviewed, indicates the magnitude of the task. Other authors have made desultory attempts from time to time to fix types in the particular genera in which they happened to be working, but it remains for the present author to treat the entire family of Tortricidæ as a comprehensive whole.

As the author states, there will naturally be a difference of opinion as to the flexibility or limitations of structure which constitute a genus. For this reason the synonymy of genera which concludes the work will be subject to change. This remark is emphasized by the fact that with two exceptions the synonymy is exactly the same as the list of species under the different generic headings in Staudinger & Rebel's 1901 Catalogue. Very little work in the European Tortricidæ has shown that the groups in this catalogue are not well assorted, and are subject to very considerable revision.

The North American and European genera appear to have been most conscientiously worked out, but it is apparent that little or no work has been done in the Indian and Australasian genera, as all of these latter are simply listed without criticism or indication that any attempt has been made to associate them with the older genera. As many of the Eastern genera have been erected on more or less unsubstantial secondary sexual characters, some of them will certainly fall into the synonymy when their structure is better known.

These criticisms do not affect the value of the work, as it only purports to fix the type of the genera, and in doing this it confers a vast benefit on all workers in this group.

The next step must be the publication of a work, containing plates showing the venation and other structure of every type species named in Professor Fernald's monograph, together with the synopsis of the characters of each genus. Of course, this must be followed with an examination of every known species of the world's Tortricidæ and a reassemblage of them under their proper generic headings.

As it necessarily must be some years before such a work can be completed, the status of generic names in our present list is of interest. The most important changes are shown in the following table, the first column of which gives the names to be substituted for the supplanted names of the American lists in column two, and the European list in column three. It may be added that this table but briefly shows the changes made necessary in the European lists. About half of their present generic names will go into the synonymy and be replaced by older names.

Fernald's Revision.	*Dyar Cat., 1902.* *Smith List, 1903.*	*S. & R. Catalogue, 1901.*
Rhyacionia, Hb.	Evetria, Hb.	Evetria, Hb.
Cymolomia, Led.	Exartema, Clem.	Cymolomia, Led.
Olethreutes, Hb. Argyroploce, Hb.	Olethreutes, Hb.	Olethreutes, Hb.
Cydia, Hb.	Thiodia, Hb. (Dyar) Cydia, Hb. (Smith)	Semasia, Hb.
Enarmonia, Hb.	Epinotia, Hb.	Steganoptycha, Stph.
Spilonota, Stph.	Tmetocera, Led.	Tmetocera, Led.
Ancylis, Hb. Anchylopera, Stph.	Ancylis, Hb.	Ancylis, Hb.
Laspeyresia, Hb. Eucelis, Hb.	Enarmonia, Hb.	Grapholitha, Tr.
Carpocapsa, Tr.	Cydia, Hb. (Dyar) Carpocapsa, Tr. (Sm.)	Carpocapsa, Tr.
Peronea, Curt.	Acleris, Hb.	Acalla, Hb.
Æthes, Billbg.	Phalonia, Hb.	Conchylis, Sodoff.

As the author remarks in the Preface, his work is incomplete. This refers particularly to certain of Walker's names of exotic genera, which have not been systematically investigated, and likewise to the names in the Billberg Enumeratio. In both of these works genera were included under the heading of Tortricidæ, which belong to other families. Most of these have been treated by the author, but it is only reasonable to suppose that likewise in other families may be found genera based upon Tortricids, which may supplant some of the names re-established in this paper.

W. D. K.

SOME RECENT PAPERS ON HEMIPTERA.

BY J. R. DE LA TORRE BUENO, NEW YORK.

(Continued from page 302.)

Another paper of interest is by Mr. G. W. Kirkaldy, "A List of the Described Hemiptera (excluding Aleyrodidæ and Coccidæ) of the Hawaiian Islands.[1]

This paper is in its nature a supplement and an addendum to his former work on the same group in the "Fauna Hawaiiensis." The arrangement and nomenclature very naturally agree with the author's views on phylogeny and nomenclature, which, I understand, will be carried out in his forthcoming catalogue of the Hemiptera, to be issued shortly. But aside from these matters open to disagreement, *with which in the main I am in accord*, there is much that is useful and of interest in the paper.

He begins by noting that the endemic families of the Heteroptera number only 8 out of the 26 recognized at the present day; and only 4 out of 12 Homopterous families; and further, that of these 12 families 6 only are represented by more than 10 species, namely: the Myodochidæ (Lygæidæ auctt), Nabidæ, Miridæ, and the first three Homopterous families. The absence of other dominant families in the Pacific "show more plainly than words the real condition of the Fauna."

"The leading characteristic of the Hawaiian Hemiptera is their tendency and almost complete adaptation to an arboreal life. All, or practically all, the Hawaiian Asiracidæ—one of the most important families numerically—are arboreal, a phenomenon otherwise known, so far, only in one peculiar Australian genus, *Proterosydne*, Kirkaldy. Acanthia, usually a riparian genus, has one species representing, no doubt, the ancestral form, inhabiting dry heaths in Europe; nowhere but in these Islands, to my knowledge, are there arboreal species."

One hundred and seventy-four species are recorded, of which 138 are considered endemic and 36 immigrant. The endemic genera reach 31. Coccidæ and Aleyrodidæ are not considered, and including these, described as well as manuscript species, he estimates the total Hemipterous fauna, endemic and immigrant, at not less than 500 species, of which 360 are endemic.

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[1] Proc. Haw. Ent. Soc., I, pt. 5, pp. 186–208, text figs. 1 to 3, pl. 4, April, 1908.

In this paper several new genera are established, a number of new species described, some synonymy cleared up, and, which makes it of more importance to students of the Pacific fauna, a large number of rectifications are made in the "Fauna Hawaiiensis." To enhance its value, Kirkaldy gives us a table of the Asiracid genera. There are three text figures of wing venation, and a plate of Homopterous genitalia, which add greatly to the usefulness of the paper.

Putting aside the debatable points, this is a really valuable contribution to Hemipterology, a fragment though it be.

The third paper[2] appeared in the *Ohio Naturalist* for June of this year, under my name, but it is in reality a careful study of certain of the fresh-water forms of the Gerrid subfamily Halobatinæ, and includes what is practically a monograph of Rheumatobates, by Dr. E. Bergroth. This paper is of so finished a character that any comment on its quality becomes superfluous. I wish, however, to call attention to it very especially, and now note a few of its salient points.

Dr. Bergroth begins by restricting and defining the subfamily *Halobatinæ*, which is characterized by having the inner margin of the eyes convexly rounded. A discussion of *Trepobates*, Uhl., follows, in which this genus and its allies, *Callistometra*, Kuh.; *Rheumatometra*, Kirk.; *Metrobates*, Uhl.; *Telmatometra*, Bergr. (gen. nov.), and *Halobatopsis*, Bianchi, are considered. The new genus *Telmatometra* is here characterized, and is at once distinguished from its ally *Trepobates* by the structure of the head, antennæ, corium and genital segments. One species, *Telmatometra Whitei*, Bergr., is described in the genus. Next in order, *Rheumatobates præposterus*, Bergr., is described. This can readily be separated from its described allied species by having the *middle* pair of legs curiously malformed in the ♂ instead of the third pair, as in other forms of the genus. This, of course, is apart from the excellent character afforded by the peculiar ♂ antennæ. Dr. Bergroth gives a table for separating the known species, and figures their antennæ. Taking it altogether, this is a most valuable contribution to Hemipterology, and indispensable to students of the semi-aquatic Trochalopoda.

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[2] On the Aquatic Hemiptera collected by Prof. H. S. Hine in Guatemala; *Ohio Naturalist*, viii, 370.

In contrast with these works is one entitled "Deutschlands Wasserwanzen," by Th. Heuber.[3] While "errare est humanum," it appears to me only reasonable for an author attempting such a subject to inform himself of the most recent work on the matter. If this entailed an enormous amount of bibliographical work, there might be some excuse, but where all that is necessary is to consult, for instance, the "Zoological Record," it seems to me that such negligence merits condemnation.

The work in question consists of an account of the Waterbugs, based on Fieber (1865) and Puton (1883). Necessarily, it is anything but accurate as regards classification, forms, etc. Tables are given for genera and species, with long descriptions, synonmy and localities. In anatomy of Nepa, for example, he refers to Dufour (1833), Burmeister (1835), and Flor (1860). All later (and really important) work is ignored. Korschelt and Heider he knows not, and Heymons is but a name. It is really regrettable that such work as this should be given to the public, especially since by its appearance of usefulness, due to its dichotomies, it will certainly enjoy some measure of repute.

In this connection I wish to point out that while much that is to-day written on the Aquatic Hemiptera is published in Hungary or in Roumania, or even in America, there are authors who have written on this subject in Europe, and what has not appeared in current English entomological publications has appeared in the "Wiener Entomologischer Zeitung," the "Annales" of the French and Belgian societies and other high-class continental mediums. Moreover, in book form there is Miall's "Natural History of Aquatic Insects," in which there is something regarding Hemiptera. And finally, I wish to call attention to what is at the moment the fullest account of European Waterbugs, and their habits, namely, Kirkaldy's "Guide to the Study of British Waterbugs," which appeared serially in "The Entomologist" at intervals from 1899 up to last yeat (1907). There are several plates of structural details, and the work as a whole summarizes the results of many investigators supplemented by the author's original researches. While later study controverts some few of his statements, nevertheless as a whole the work is remarkably free from errors. As to what it purports to be, "A Guide," it can be heartily recommended as a foundation for work on Waterbugs, but it must be borne in mind that there is much later research work now available in certain of the groups treated.

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3. Jahresheft, Ver. Vaterl. Naturk. Wurttemb., 61, 1905, pp. 91–175.

BUREAU OF ENTOMOLOGY, WASHINGTON.

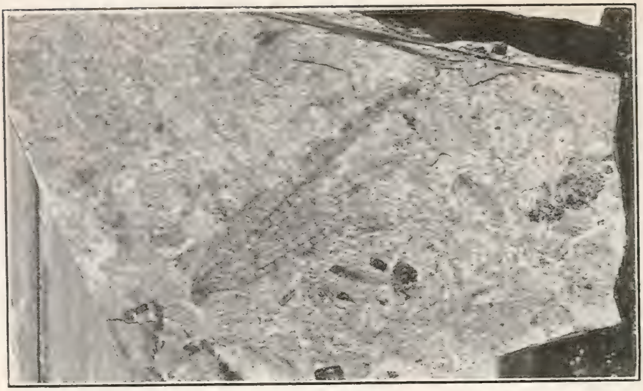
We learn from *Science* that in the Bureau of Entomology the salary of the Entomologist has been increased from $3,250 to $4,000. The total appropriation is increased by $48,950, making it $184,960 ; this includes the Cotton Boll-weevil investigations, which have heretofore been carried in an emergency appropriation. In addition, the Bureau has charge of the Gypsy and Brown-tail Moth campaign, for which an emergency appropriation of $250,000, an increase of $100,000, was made, the entire amount being immediately available. The silk investigations in progress for several years are to be brought to a close.

MR. H. GROH, B. S. A., Ontario Agricultural College, Guelph, has recently been appointed an assistant in the Division of Entomology and Botany, over which Dr. James Fletcher presides, of the Experimental Farms of the Dominion.

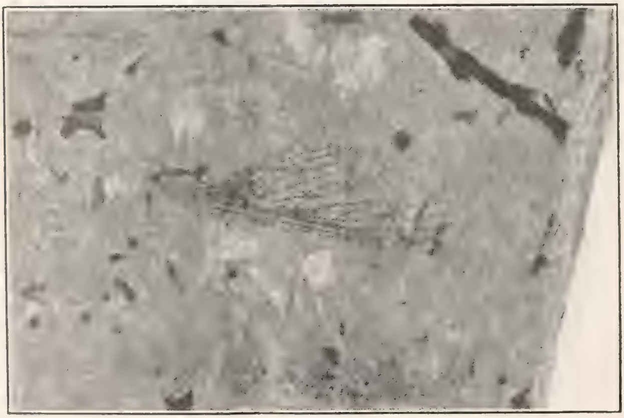
His many friends will learn with deep regret that MR. J. A. GUIGNARD, for many years Dr. Fletcher's chief assistant, has felt compelled to resign, owing to advanced age and infirmity, the position which he so usefully filled. He has returned to his native Switzerland, where, it is to be hoped, he may have a prolonged period of rest and quiet happiness.

THE BRITISH MUSEUM has lately published "The History of the Collections contained in the Natural History Departments" (2 vols., 1905–7). Under "Insecta" there are lists of the accessions for each year, and the number of species and specimens in each order. The entire number of insects in 1904 was over 1,018,000 specimens, including 153,000 named species. The Coleoptera head the list with 398,000 specimens and 67,300 species ; Lepidoptera 355,700 specimens, 41,000 species ; Hymenoptera 132,000 specimens, 20,000 species ; Hemiptera 57,650 specimens, 11,700 species ; Diptera 47,000 specimens, 7,400 species ; Orthoptera, 18,800 specimens, 3,900 species ; other orders 9,200 specimens, 1,900 species. (These round numbers are the approximate figures to those given.) The largest single collection ever received was the great Bowring collection of 230,000 Coleoptera; the Stephens collection contained 90,000 specimens of various orders ; the Leech collection over 50,000 Lepidoptera ; the Pascoe collection 45,000 Coleoptera, including over 3,000 types. These are the most extensive contributions recorded, and formed very notable additions to the possessions of the Museum.

Mailed September 3rd, 1908.



FOSSIL OSMYLUS—O. COLUMBIANUS.



FOSSIL MANTIS—LITHOPHOTINA FLOCCOSA.

The Canadian Entomologist.

VOL. XL. LONDON, OCTOBER, 1908. No. 10.

FOSSIL OSMYLIDÆ (NEUROPTERA) IN AMERICA.

BY T. D. A. COCKERELL, BOULDER, COLORADO.

The Hemerobiidæ, as understood by most authors, are divided by Handlinsch into several families: Dilaridæ, Osmylidæ, Polystoechotidæ, Sisyridæ, Nymphesidæ, and Hemerobiidæ. Of these, the Hemerobiidæ proper are abundantly represented in the North American fauna; while (according to Banks, as shown by his recent Catalogue) we have two species of *Polystoechotes*, one each of *Sisyra* and *Climacia* (Sisyridæ), and one of *Dilar*. The Osmylidæ are not represented. In the Miocene shales of Florissant we find instead one *Polystoechotes*, two Osmylidæ, and no Hemerobiidæ, Sisyridæ or Dilaridæ. Probably not much importance should be attached to the apparent absence of several groups, but the existence of Osmylidæ, an Old World group, is significant, and in harmony with other facts, such as the occurrence of a species of Nemopteridæ in the shales.

Scudder described one of the Florissant Osmylids as *Osmylus requietus*. He prefaced his account (Tertiary Insects, p. 162) with the following remarks: The species we have placed here agrees somewhat closely with the species from amber, *Osm. pictus*, referred by Hager to this genus, but differs from it in its lack of any diverse colouring in the wings, as well as in some minor points of the neuration, as in the distance of the outer series of gradate veinlets from the outer border of the wing, their regular connection with one of the basal branches of the radius, the regularity of the inner series of gradate veinlets, as well as the structure of the cubital region. The two Tertiary species, however, agree together, and disagree with the living types in the simple character of the costal nervules, the much smaller number of sectors, and the character of the basal half of the wing, where the sectorial interspaces are regular and broken by few and irregularly scattered cross-veins, instead of being so numerously supplied as to break up the field into an almost uniform and minute reticulation. The two fossil species would therefore appear to form a section apart.

I found *Osmylus requietus*, Scudd., in the shale at Station 13. The specimen agreed with Scudder's type, except that it was a little smaller, the wings 14 mm. long instead of over 15. The insect differs conspicuously from typical *Osmylus* in the characters mentioned by Scudder, and may, I think, form the basis of a new genus *Osmylidia.* Whether the species from Baltic amber should be considered strictly congeneric, I will not venture to decide. In many of its characters this genus is closely allied to the very much older *Nymphites Craneri*, Haase, from the lithographic stone of Bavaria; indeed, it may fairly be said that *Osmylidia* is intermediate between *Nymphites* of the Jurassic, and *Osmylus* of the present day.

Osmylidia requieta (Scudd.) is, however, not the only Osmylid fossil at Florissant. At Station BB, this year, my wife found a much larger species, represented by a wing, of which enough is preserved to show the generic characters. This wing is about 25 mm. long, with dark veins, and dark spots very much like those of the living *Osmylus chrysops.* Toward the apex, the costal region is irregularly and diffusely maculated; in the middle region of the wing there are two small round spots, the first about 6, the second about 15 mm. from the base; toward the hind margin, 10 mm. from the base, is a rather larger spot. All of these spots correspond with those existing in *O. chrysops* (anterior wing). As regards the venation, many of the costal nervules are forked, exactly as in *O. chrysops;* the cross-nervures in the region of the media are numerous, as in *O. chrysops;* and, in short, the insect is a perfectly typical *Osmylus*, closely related to the living species. The cross-nervures between the radius and radial sector are most of them heavily clouded; the oblique branches of the radial sector leave at approximately regular intervals; the costal area is perhaps not quite so full as in *O. chrysops.* This insect, which proves that genuine *Osmylus* once inhabited the Rocky Mountains, may be termed *Osmylus Columbianus*, n. sp. I take this opportunity to add notes on two other Neuroptera.

(1) *Hemerobius moestus*, Banks, 1897 (not of Hagen, 1854, a fossil species), must be called *H. bistrigatus*, Currie, 1904.

(2) *Megaraphidia*, Ckll. (fossil at Florissant). The characters of this genus are approached by the living *Raphidia rhodopica*, Klapálek, Trans. Ent. Soc. Lond., 1894. It is possible that *Megaraphidia* should be reduced to a subgenus.

THE FIRST AMERICAN FOSSIL MANTIS.

BY T. D. A. COCKERELL, BOULDER, COLORADO.

Only two species of Mantidæ have been described from Tertiary formations: *Mantis protogæa*, Heer, from the Upper Miocene of Œninger, and *Chætoessa brevialata*, Giebel, from Baltic amber. *Chætoessa*, or more properly *Chæteessa* (Burmeister, 1838), is known to-day by three species, all from Brazil; it is not very likely that the amber insect is really congeneric. Heer's *Mantis protogæa* is a very poorly preserved object, from which little can be learned. The discovery of a nearly perfect tegmen in the Miocene shales of Florissant adds the group to the fauna of the American Tertiaries. The venation is of a comparatively simple type, and may be compared with that of the E. Indian and African genus *Gonypeta*, as figured by Handlirsch (Fossile Insekten, Part 1, pl. 2, f. 5). I sent a drawing of the venation of the fossil to Mr. A. N. Caudell, calling attention to its supposed affinities, and asking him whether he could find any other genus showing stronger resemblance. He kindly replies: "I know of no modern genus more likely to contain it than the one you mention. I presume without doubt it is an extinct form representing a new genus." In the meanwhile, however, I have received from Mr. Rehn a copy of his figure of *Photina brevis*, from Paraguay (Proc. Acad. Nat. Sci. Phila., 1907, p. 157), and this is apparently as near to the fossil genus as *Gonypeta*. The most that can be said about the fossil is that it represents a generalized form of the subfamily *Mantinæ*, apparently distinct from, though allied to, those now living.

Lithophotina, n. g.

Costa little arched; costal region narrow, reticulated, so that the cells above the subcosta (very irregular) are mostly double; subcosta terminating on costal margin about 2½ times as far from base as from apex; radius ending a little above apex of wing, *not at all branched below* (branched below, forming a radial sector,* in *Gonypeta* and *Photina*), but giving off about three very oblique branches above, the last of these being itself branched; media branching a little before the middle, the upper branch again branched about 5½ mm. from the apex, *but the lower simple;* cubitus with three long branches, of which the first is branched about 10 mm. from the base of the tegmen; anal with three branches,

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*I here follow Handlirsch's interpretation (for *Gonypeta*), but comparison with the fossil suggests that the so-called radial sector is really the main stem of the radius, while the supposed end of the radius is the last of the upper branches.

the first two united for about 1½ mm. beyond the separation of the lowest; anal lobe obliterated, but I do not think it was very large.

Lithophotina floccosa, n. sp.

Length of tegmen about 21½ mm., width 7; apparently subhyaline, with brown veins, and obscure, irregular brown mottling.

Florissant; Miocene, Station 14 (*W. P. Cockerell*, 1907).

THE GENUS EUPITHECIA AND ITS ALLIES.

BY RICHARD F. PEARSALL, RROOKLYN, N. Y.

The present paper must necessarily be, in part, of a tentative character, for the active attention which has been accorded the Geometrinæ of late has resulted in giving us many new species, and their affiliations are yet to be wrought out. My object is partially to clear the way for future and more mature work. Of the genera allied with *Eupithecia*, Dr. Hulst has placed two in our list, one of which, in the light of recent research, must be excluded therefrom, and the other greatly restricted, viz., *Chloroclystis*, Hubn., and *Gymnocelis*, Mab. The former is represented by a single species, *inconspicua*, Hlst., the female type of which is in the Hulst collection at New Brunswick, N. J. Upon examination, it proves to be the female of *Selidosema Wrightiaria*, Hulst (Dyar, 3829), a species described in 1888 from four males, taken in Southern California. It has vein 8 of hind wings not connected with cell, and vein 5 wanting. *Inconspicua* becomes therefore a synonym, and the genus is left without a known representative in our fauna, and must be dropped. This conclusion was first reached through study of a small series of *Wrightiaria*, taken at Pasadena, Calif., in my own collection, and later confirmed by reference to the type.

Gymnocelis has been the subject of a recent paper by Mr. J. A. Grossbeck (Journ. N. Y. Entom. Society, March, 1908), presenting facts relating to the various species under it, which are in line with my own observations, and show conclusively that *minuta*, Hlst., is the only species which we know at present as fitted to remain in the genus. The others form a group, as he points out, not possible of combination with *Eupithecia*, even if it were desirable to place them in that already overcrowded genus, and although in individuals of one species, *remorata*, Gross., the upper spurs of the hind tibiæ may be absent, in other respects it does coincide with the group, nevertheless it appears to me that they should be assembled under a distinct genus. For this genus I propose the name *Nasusina*, the nose-like prominence of the front being common to all, with the following limitations :

Nasusina, n. gen.

Type *inferior*, Hulst.

Fixed.	*Variable.*
Antennæ, flattened, shortly ciliate, slender.	Thorax, untufted.
Palpi, moderate.	Abdomen, with low tufts, or none.
Front, horizontally projecting, with pad or cushion of scales, rounded above clypeus.	Venation, hind wings, 6 and 7 long-stemmed, 3 and 4 widely separate.
Tongue, developed.	Accessory cells, one.
Fore tibiæ, unarmed.	
Hind tibiæ, end spurs normal, upper spurs much reduced, or absent.	
Hair pencil in ♂ absent.	
Venation, hind wings, vein 5 present, vein 8 anastomosing with cell nearly cell's length.	

The species at present recognized are :

inferior, Hulst.
desperata, Hulst.
remorata, Gross.
gypsata, Hulst.
discoidalis, Gross.
artestata, Gross.
mellissa, Gross.

The type form is constant so far as I can determine, but the species are rare in all collections. Of the type, I have not seen more than twenty examples, ten of which are in my own cabinet.

Eupithecia, the central genus, should be left for later assemblage into a series of groups or sections, having as a basis for separation, for instance, the biciliation of the antennæ as in the *lachrymosa* group, or even minor characters, some one thing which will serve to include an orderly series. For the present this is impossible, until the species themselves are determined, and especially does this apply to the many forms inhabiting our western territory.

NOTES ON CALIFORNIA BUTTERFLIES.

BY KARL R. COOLIDGE, PALO ALTO, CALIF.

Observations on the Life-history of Chrysophanus gorgon, Boisd.

Chrysophanus gorgon flies throughout California in the foothills and lower mountains, not inhabiting the valleys and plains to any extent. It is also found in Nevada. Like other *Chrysophanids*, such as *editha*, *zeroë* and *cupreus*, it has a rather wide distribution, yet is very local. I had collected over two years in this county before I was aware of its existence here. Mr. J. G. Grundel, at Alma, in this county, wrote me last season that it was quite common there at an elevation of several thousand feet, on the dry, hot hillsides, where its food-plant thrives. Several days later I caught a fine fiery ♂, the only one I have ever seen in the valley proper. Of the life-history, Mr. Grundel has published a few brief notes (Entom. News, XV, 97, 1904), and I have given a description of the egg, which I here repeat, in my review of the genus.*

Egg.—Diameter about 1 mm.; colour dirty creamy-white. Hemispherical, flattened at base, marked by numerous polygonal or semicircular depressions. The food-plant is a species of *Eriogonum* (not *Erigonum*), probably *nudum*, Douglas, a genus closely related to Rumex, which is a common food-plant for *Chrysophanids*. The plant grows only on the very dry hillsides, and it is in such places that *gorgon* may be found abundantly. The eggs are laid in the forks of the plant, only one being laid in a single fork by the same female, but the act is repeated by others until there may be as many as seven or eight. On the last day of May this year Mr. Grundel and I were collecting in the Santa Cruz Mountains, where we found *gorgon* unexpectedly abundant and fresh. The females are ordinarily quite rare, but we took the sexes in about equal proportion. Several times I observed a female ovipositing. Alighting on the stalk, she slowly backs up until she reaches the fork, when, curving her abdomen downwards, she deposits an egg. In late May, June and July oviposition takes place, and the young larvæ normally hatch towards the end of August. They are nocturnal, hiding in the daytime in the leaves and rubbish at the base of the plant. They very readily feign death, and sometimes, when disturbed, remain motionless for hours at a time. At first the larvæ feed on the upper sides of the leaves, which they greatly resemble in colour. Later, after several instars, they become lighter, and they then feed on the under surface, to which they are now similar. They grow very slowly, as the eggs hatch in late August and the larvæ do not attain maturity until the latter part of April and early May.

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*Psyche, XIV, 118, 1907.

Mature Larva.—Onisciform, attenuated at the extremities, with the posterior end well rounded; thickly pilose, hairs somewhat clavate; colour light whitish-green, but slightly darker than the under side of the leaves of the food-plant. Segments sharp; head minute, pale, retractile within the first segment. Dorsal surface convex, with a wide but faint dorsal band in which is contained a narrower darker line; ventral surface flat, hiding legs and prolegs, somewhat lighter than above; a creamish-white lateral stripe just above the spiracles. Length about 18 mm.; width about 8 mm. Pupation takes place on the under side of the lower leaves and in the leaves and rubbish on the ground. The pupa is suspended by the anal extremity and with a median loop. Two of my larvæ pupated freely among the leaves in their boxes.

Pupa.—Short, stout, of the same general colour as the larva, slightly ashen posteriorly; abdomen with numerous rather faint black points, arranged in longitudinal series. Length, 10 mm.; width, 5 mm. I had but three pupæ, and as these emerged during my absence, my description is drawn from a few rough notes. The imagoes vary considerably in colour, the females particularly. One specimen which emerged from a pupa, the larva of which was obliged to pupate prematurely on account of lack of food, expanded but a little over one inch. The average expansion is from 1.25–1.30 inch. I have also in my collection a striking ♂ aberration, in which the spots of the under surface are greatly produced into long black dashes, somewhat after the fashion of the inferior surface of the secondaries of *Lycæna sagittigera*; above it is quite normal.

The Larva and Pupa of Lycæna piasus, Boisd.

As far as I am aware nothing is known of the life-history of *piasus*, except that Lembert (Entom. News, VI, 138, 1895) writes of its oviposition, "on the racemes of the *Lupinus densiflora*, and on the bracts of *L. chamisonis* after they have fruited." He also writes, "*Lycæna* var. on the inner side of the unopened buds of the thrysus of the *Æsculus Californicus* (Buckeye)." The latter is also probably *piasus*, as I have several times this season found the larva on *Æsculus* blossoms. On the first of June, while on a collecting trip, I found several full-grown larvæ, which I collected, intending to get a description of them. Both had pupated, however, before I returned home. The larva, as I remember it, was of a light greenish-white colour, somewhat pink-tinged. It was slug-shaped, attenuated, the dorsum convex, the ventral surface flattened, the legs retractile. Pupation took place freely among the leaves.

Pupa.—Colour dark brown, somewhat lighter on the ventral surface. On abdomen several indistinct longitudinal series of black spots. Posterior and anterior ends well rounded; ventral outline straight; dorsal outline, except for a depression on the mesonotum, very evenly rounded. Length, 7 mm.; greatest breadth, 4 mm. One larva pupated June 1st, and the perfect insect emerged June 23rd.

A SECONDARY SEXUAL CHARACTER OF APHIDIDÆ, II.—SUPPLEMENTARY.

BY JOHN J. DAVIS, OFFICE OF THE STATE ENTOMOLOGIST, URBANA, ILL.

Since the publication of "A Secondary Sexual Character of Aphididæ," in Can. Ent., August, 1908, Dr. John B. Smith has called my attention to two important papers on the tibial sensoria, which I overlooked in the review of previous literature on the subject.

In Science for January 20, 1893 (Vol. XXI, p. 31), Dr. Smith speaks of having found these "sensory pittings" on the hind tibiæ of several species of the oviparous female aphides, and that "these structures differed in each of the species examined in size, arrangement and number." He quotes a letter from Dr. C. V. Riley, to whom he had written for data as to the occurrence of these sensoria in other species, which states that he had found these "pits" present in *Aphis mali*, *A. pruni*, *Myzus mahaleb*, *Siphonophora rosæ*, *Siphonophora sp.*, on rose; *Callipterus sp. ?* on oak; in *Phyllaphis fagi*, and in *Melanoxanthus salicti*, but had not found them present in *Schizoneura*, *Glyphina*, *Pemphigus* or *Phylloxera*. Dr. Smith further mentions and figures these tibial sensoria, in Bulletin 143 of the New Jersey Agricultural Experiment Station, pp. 19–20, 1900, as occurring on the hind tibiæ of the oviparous females of *Aphis mali*.

Mr. R. A. Vickery, in "A Comparative Study of the External Anatomy of Plant Lice" (separate from the 12th Report of the State Entomologist of Minnesota, May, 1908), says, in his discussion of the legs of the *Aphididæ*, p. 11, "In the oviparous female of *Nectarosiphum rubicola*, *Rhopalosiphum hippophaë*, *Callipterus trifolii*, *Toxoptera graminum*, *Macrosiphum pisi* and others the tibia of the hind leg is swollen for its whole length, and is thickly dotted with clear pits, which closely resemble the sensoria of the antennæ. The tibia in this case has some function in connection with oviposition."

A NEW SPECIES OF THE TORTRICIDÆ.

BY PROF. C. H. FERNALD, AMHERST, MASS.

Argyroploce abietana, n. s.—Expanse of wings, 21–23 mm. Head, thorax and fore wings dark brown, varying somewhat in intensity of colour, some specimens being lighter than others, caused more or less by yellowish-brown scales intermixed with the dark brown. This is especially noticeable in specimens taken in Amherst, Mass., as compared with specimens taken in Maine. The fore wings are crossed by three silvery-white bands, the first of which, arising from the basal fourth of the costa and ending at the basal third of the hinder border, is divided by about three fine, thread-like, irregular dark brown lines extending across the wing through this band which receives, near the middle, an outward angle or tooth of varying form, from the basal brown part of the wing, and there is sometimes a similar one on the outer side. The second band arises from two small geminate white spots on the costa above the end of the cell, the stripes from which unite at the end of the cell, and this band ends at the outer fourth of the hind margin, and has a dark brown tooth extending into it on the inner side on the median vein. The sides of this band are irregular, caused by indentations from the dark brown on each side. On the costa, beyond the costal origin of the middle band, are two equidistant, geminate, silvery-white streaks, the first of which is short, while the other extends downward, giving off two branches in succession, to the outer margin above the middle, and is often connected below with a similar stripe extending up from the anal angle, and also giving off branches to the terminal margin. Fringes dark fuscous, with a darker extrabasal line.

Hind wings and abdomen above fuscous, with lighter fringes, which have a darker extrabasal line. Under side of fore wings fuscous, with the geminate costal spots reproduced beneath. Under side of hind wings, thorax, abdomen and all of the legs fuscous, the tarsal segments tipped with whitish.

Described from three male specimens taken in Amherst, Mass., one of which I make the type, and four males from South Paris, Maine, sent to me by Miss Edith M. Patch, Entomologist at the Maine Agricultural Experiment Station at Orono, Me. Miss Patch wrote me as follows: "On May 20 I received from South Paris, Maine, webbed twigs of spruce containing pupæ of a Tortricid which had ruined some small spruces. The moths began to emerge May 29."

This insect occurs in Amherst on Norway spruce. The larvæ were found May 7 to 10, 1891, and the following description was prepared by Miss Rose L. Davis :

"The larvæ of this insect were found on young Norway spruces on the Agricultural College grounds, under white silken webs at the base of the leaves, which were mined by these minute larvæ. A small hole was made on one side near the base and the entire contents were consumed, leaving the leaf dead and of a dull reddish colour.

"The larvæ, when full-grown, are about 7 mm. in length, cylindrical in form, with the head of medium size, of a shining yellowish-brown colour, and with a few fine hairs scattered over the surface. The rest of the body is of a light greenish-brown colour, semitransparent. The thoracic and anal shields are of a pale greenish colour, with the usual fine hairs on these and over the surface of the body. When disturbed they quickly let themselves down by a silken thread. The moths emerged June 2 to 5, 1892."

I received four male specimens in poor condition from Prof. R. A. Cooley several years ago, taken in Montana, but without any particulars as to food and habits. These differ in no specific way from the Maine specimens sent me by Miss Patch, except in size, the wing expanse of which is 14–15 mm.

THE EARLY STAGES OF *SAMIA COLUMBIA NOKOMIS.*

BY W. J. FREEDLEY, JR., PHILADELPHIA, PA.

Eggs deposited April 18, 1908 ; length, 2.6 mm.; breadth, 2 mm.; depth, 1.5 mm. Flattish, and with a slight compression top and bottom. Colour of egg apparently creamy-white, but very much discoloured by the brown adhesive matter which attaches it to the object on which found. Eggs much smaller than those of *S. Cecropia*. Larva, when first emerged, from 3 to 4.5 mm. in length, glossy-black, with light green shading at the base of tubercles. The tubercles glossy-black, with from 3 to 7 spines also glossy black. Head large, glossy black, sparsely clothed with hairs. Within two hours the larvæ lost all the green shading, changing to glossy black all over. On the fourth day the segments had a faint ochraceous shade showing, which on the sixth day developed into a strong ochre-yellow ground colour for the larvæ, which still had glossy-black head, tubercles and spines. At the end of the sixth day the length was 10 mm.

The tubercles were numbered as follows: Eight on each of first five segments, six each on next five, five on the eleventh, with the dorsal one large and prominent, six on the twelfth.

On the eighth day the larvæ stopped feeding and showed signs of the first moult; anteriorly they had a slightly swollen appearance, owing to the head being drawn into and partly under the first segment. On the ninth day the swollen appearance increased, and the larvæ diminished in length; all, with the exception of two, losing the bright ochre-yellow colour, which was replaced by a dull yellowish-brown, shading darker near the base of the tubercles.

On the tenth day all but five of the larvæ had moulted. Immediately after moulting they came out a brilliant orange-yellow, with head, legs and tubercles translucent, and black spines on tubercles. At this stage the length equals 13 mm. On the eleventh day increase in size was the only change noticed.

On the twelfth day the largest larvæ were from 14 to 17 mm. in length, had moulted once, and the colour faded from ochre-yellow to a pale canary, with the joints between segments showing pale pea-green. Head, tubercles, spines and a band near the base of the abdominal legs, also the prolegs, glossy black.

On the thirteenth day the larvæ were from 17 to 18 mm. in length; no other change; but on the fourteenth day the largest stopped feeding, evidently ready for the second moult. Head drawn into and under the first segment; colour pale yellow, with slight greenish tinge between segments.

On the fifteenth day the largest larvæ moulted, changing within two hours to a greenish-yellow, but on the sixteenth day this changed to a pale pea-green, with a slight bluish tinge dorsally and canary-yellow at base of tubercles. The length was from 20 mm. to 23 mm. A slight increase in size was the only change noted on the seventeenth day, the largest being from 26 to 29 mm. in length. All the larvæ fed ravenously on *Salix alba* (cf. Canad. Entom., Vol. X., pp. 43–44). During the afternoon one of the larvæ, a very large one, showed signs of being ready to moult.

Except for a slight increase in size, no change was observed during the next two days, but on the twentieth day they passed the third moult. Length from 28 mm. to 31 mm.; head yellowish-green, spotted slightly with dark brown; ocelli black; prolegs yellowish-green; thoracic legs a glossy black. Segments clear bluish-green; first segment with eight black tubercles with black spines; from the second segment to the tenth, inclusive, the two dorsal tubercles bright yellow with black spines; the large dorsal tubercle on the eleventh segment the same colour; all the lateral tubercles and all the tubercles on the twelfth segment glossy black, with black spines.

On the twenty-first day the only change noticed was that the thoracic legs were greenish-yellow with glossy-black tarsi, but on the twenty-second day the increase in size was very marked. The length had increased from 36 mm. to 44 mm. At this stage the larvæ, when resting, assumed nearly the same position as when ready to moult, but the head was not quite as much withdrawn into the first segment. On the following day the larvæ were preparing to moult, assuming the same position as usual, with head drawn into and under the first segment, contracting to the length of 33 mm.

On the twenty-fourth day the larvæ moulted for the fourth time, coming out a greenish-slate colour, with head translucent pea-green, dorsal tubercles ochre-yellow, lateral tubercles light blue. On the twenty-fifth day the larvæ were from 48 to 52 mm. in length; head yellow-green; first segment pea-green; segments 2 to 12, inclusive, slate-green; segment 13, prolegs and anal prolegs pea-green and sparsely clothed with hairs; thoracic legs clear green with black tarsi; mandibles clear green with a slight pinkish tinge. Tubercles on first segment small, glossy black, with no spines; the two dorsal ones on 2nd, 3rd and 4th large and prominent, ochre-yellow, with side towards head glossy black, with eight glossy-black spines. Two dorsal tubercles on segments 5–10 ochre-yellow, with from one to three glossy-black spines; large dorsal tubercle on segment eleven ochre-yellow, with eight black spines; all tubercles on 12th segment light blue, with from two to five spines; two dorsal tubercles on 13th segment, glossy black, with light blue tips and black spines. Lateral tubercles on segments 2, 3 and 4 light blue, with black spines; on segments 5–10, inclusive, pearl colour, with from one to three spines; all spines throughout glossy black.

On the twenty-seventh day length was 52 mm. contracted, 60 mm. extended; no other change. On the twenty-eighth day a slight increase in size was the only change noted; but on the twenty-ninth day the increase was much more marked. At this time the length was from 68 mm. contracted, to 76 mm. when in motion; the larvæ were very healthy looking, and eating most of the time. On the thirtieth day there seemed no change, except that the largest showed less inclination to eat. On the thirty-first day all the larvæ were feeding well again, and the length was from 73 mm. contracted to 84 mm. when in motion. At this stage the segments were exactly the colour of the under surface of the leaves of *Salix alba*, a light gray-green. Otherwise there was no change. On the thirty-second day the only change noticed was that two of the larvæ stopped feeding, emptied their intestines of a very dark viscous fluid, and began to wander around the jars in which they were confined. On the thirty-third day, at 11 a.m., one of these began to spin, and at 7.30 p.m. the other did the same. On the thirty-fourth day the remainder of the larvæ, with one exception, fed ravenously, and on the thirty-fifth day one more cocoon was found in the jar. This cocoon seemed very much lighter in colour than the other two, possibly owing to its being spun on a white handkerchief, instead of directly on the side of the jar, as in the case of the other two. At this time the remaining larvæ were clear pea-green, with a slight bluish tinge dorsally ; otherwise the colour was unchanged.

On the afternoon of the thirty-sixth day another of the larvæ began to spin, but the rest of the lot kept on feeding. The one spinning did not empty its intestines, nor did it wander around the jar. On the thirty-seventh day another cocoon was found, and the remaining larvæ all showed signs of spinning, with the exception of one. Another cocoon was found on the thirty-seventh day, and still another on the thirty-eighth. One larva died from no apparent cause, as it simply refused to feed and gradually shrivelled up. This larva was examined carefully with a glass, but showed no signs of being parasitized ; the only peculiar thing noted was that it was continually passing a clear watery fluid, and no regular "balled" frass.

The cocoons which were spun directly on the glass of the jars were very free of the silvery threads so characteristic of Columbia, the silver-silk being apparently used up in making a mat on which to construct the cocoon. This mat, stretched over a space of about 4½ inches by 2¾ inches, was very loosely laid at the outer margin, but next to the cocoon was quite dense. Those cocoons formed on the twigs provided for the purpose were a strong reddish-brown colour, with streaks and patches of silvery-silk distributed over the surface of the cocoon. The inner cocoon was of very close texture, much like parchment, and of a rather light coffee colour ; very different from the inner cocoon of Cecropia, which is very fluffy and of a light straw colour. The size of the cocoon is as follows : Length from 2 to 2⅓ inches ; thickness from 1⅞ to 2⅛ inches. It was rounded at one end and drawn out to a point at the other, with the effect of a valve at the pointed end ; the inner cocoon was egg-shaped.

The above description is based on larvæ raised from moth to cocoon by myself at the Academy of Natural Sciences of Philadelphia, through the courtesy of Dr. Skinner, the entomological curator. Dr. Skinner kindly turned over to me a number of eggs of this fine moth, seven of which I succeeded in bringing through the various larval stages.

NOTE BY DR. HENRY SKINNER.—The Rev. Clement Hoyler, of Strathcona, Alberta, kindly sent me a number of these cocoons last March. He says of them: "About 75 per cent. of the cocoons I obtained this season were attached to young willow shoots, so far as they were brought to me attached to anything. The remainder were attached either to rose bushes, balsam or trembling poplar, and in individual cases to the stalks of an herb, the twining stem of *Lonicera parviflora* and a tamarack fence-post. In all cases the cocoons were either in the midst of or comparatively near willow bushes. As to their height above ground, the distance ranged from 8 to 18 inches as a rule." The moths are smaller than *Columbia* and much brighter in colour. Dr. Fletcher writes me that this variety was described as *Platysamia Columbia nokomis* in "The Biological Review of Ontario," in October, 1894. As this publication is not in our library, I have been unable to examine it. The larvæ present many differences from the descriptions of those of *Columbia* in the literature The larvæ were given a variety of plants,* but refused to feed on any kind but *Salix alba*, and flourished on it.

ENTOMOLOGICAL RECORD.

With Mr. Gibson's assistance, I have been taking notes during the past season of all rare captures of insects made in Canada, or of insects which have occurred at unusual seasons or outside their known limits. These will be worked up for the Entomological Record for the year, as usual. I shall be obliged to all readers of the CANADIAN ENTOMOLOGIST who will send in to me to the Central Experimental Farm, at Ottawa, any records suitable for this purpose. I would also ask those sending in records in the orders studied by them, to prefix in all cases the number in the recognized check list of the order, or in the case of Diptera, the page in Prof. Aldrich's Catalogue. This is a small matter for those sending in the lists, but is a much more serious undertaking when all of these lists have to be consolidated and worked up in a short time after all the lists have been received.—J. FLETCHER, President Ent. Soc. Ont.

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*Ash, Norway Maple, Alder, Apple.

MOUNTING INSECTS FOR THE MICROSCOPE.

BY J. R. DE LA TORRE BUENO, WHITE PLAINS, N. Y.

Dr. Packard's little book, "Entomology for Beginners," while not exactly adapted to mere tyros, is really most suggestive to such as have gone more deeply into the science. Its last chapters on dissection and the preparation of insects for the microscope are especially useful, and contain many helpful hints. From them I gathered my first notions of the use of alkaline solutions for cleaning material, and of turpentine and carbolic acid as cleaning and fixing agents. From Professor Gage's book, "The Microscope," I learnt much of technique, and among other things the use of carbol turpentine.

In my work in breeding water-bugs, it has been my endeavour to dissect where possible or necessary, and to mount entire where the size of the insect permitted, for the microscopic study of anatomy, which is a far more satisfactory method than the examination of the entire insect by means of a hand magnifier, or even under the microscope by reflected light.

My first work was very orthodox. My dissections and bugs were passed through different grades of alcohol, then through turpentine, and finally cleared by means of oil of cloves. From Professor Gage's book I absorbed the idea that all the gradual changes in the alcohol might be advantageously omitted, which was done, and by various steps not necessary to detail, my present procedure was evolved. It must be borne in mind, however, that it is not my aim to bring out details of internal anatomy, such as muscular structure, nervous or digestive systems, etc., but to prepare the insect for the study of its external organization.

The simplest process is by the use of carbol turpentine. This I have prepared by mixing approximately equal parts of carbolic acid crystals with spirits of turpentine. Gage's exact formula for this is 40 cc. carbolic and 60 cc. turpentine. Into this the living insect is plunged, and it ceases to struggle in a minute or less. In general, the legs and wings are spread out when the insect finally succumbs, and no further arrangement is necessary for mounting. After 24 hours or so, or even as little as 12, it is possible to mount. In fact, the longer the time that elapses, the harder and more brittle the insect becomes, so that there is danger of breaking off appendages by the mere weight of the cover glass. Flies killed in this medium extrude the tongue most beautifully.

For dead insects from the cyanide bottle the method is slightly different. These are put at once into 95% alcohol, and after dehydration for not less than 24 hours, are drained on a piece of filter paper and put into pine spirits of turpentine, or sometimes into the carbol turpentine, for some hours. I generally leave all this material overnight or longer, according to the time I have for mounting.

All mounts are in balsam in xylene (xylol), without pressure, except for flat objects. If a sufficient amount of balsam be used, the insects will not be crushed out of shape. For bulky ones, however, a cell of some kind is advisable.

In the work on the respiratory system of *Belostoma* and of *Ranatra*, while the final dissections were mounted by the alcohol and turpentine method outlined above, the specimens were obtained as follows: The bug preserved in alcohol was cut longitudinally in half by means of a scalpel or a pair of scissors. The two halves of the body were then carefully boiled in a strong solution of caustic potash after the alcohol was quite thoroughly washed out. This, of course, largely takes place in the preliminary dissection. The boiling potassium hydrate dissolves out all the viscera and leaves the entire tracheal system untouched *in situ*. Care must be exercised, however, not to carry the solution too far, as otherwise the tracheæ themselves will be attacked. It is now a simple matter to dissect out tracheæ and spiracles for mounting. The dissections must be repeatedly and carefully washed in clean water, which must be changed each time, until not a trace of the alkali remains, before being put into plenty of 95% alcohol. The turpentine clearing is the next step, and the preparation is ready for mounting.

Mounts of the false spiracles of *Ranatra* thus prepared show the occluding membrane of the round perforations and the slit-like true spiracle situated in the widened peritreme.

ENTOMOLOGICAL SOCIETY OF ONTARIO.

The forty-fifth annual meeting will be held at the Ontario Agricultural College, Guelph, on Thursday and Friday, November 5th and 6th. On the former evening there will be a public meeting in Massey Hall, when addresses will be given by President Creelman, of the College; Mr. C. C. James, Deputy Minister of Agriculture for Ontario; Dr. Fletcher, President of the Society, and an illustrated lecture by Dr. E. P. Felt, State Entomologist of New York. Morning and afternoon sessions will be held, at which papers on scientific and economic entomology will be read, and officers will be elected for the ensuing year.

GENERA INSECTORUM, Fascicule 72.—Innumerable errors mar the pages of this Fascicule. While mostly of minor importance, these mistakes are, nevertheless, decidedly objectionable. Many of them would have been eliminated had it been possible to secure a second proof of the text. This, however, the publisher refused to send, in spite of a very urgent request from the writer to do so. The most serious error noted is on p. 25, 6 lines from the top, where *Psorodonotus radiata* should read *Psorodonotus pancici*.—A. N. CAUDELL.

SOME REMARKS ON THE PHYLOGENY OF THE HEMIPTERA-HETEROPTERA.

BY G. W. KIRKALDY, HONOLULU, HAWAIIAN ISLANDS.

The classification of the Heteroptera, as usually adopted by the Systematists of to-day, seems to be somewhat far from representing the real phylogeny of the suborder. Schiödte's illuminating paper of 1869 has been little followed by the majority of workers, who seem to have misapprehended some of the salient points.* The order of families adopted by Lethierry and Severin, that put forward by Osborn, and that used lately by Distant, which is practically a copy of Saunders's, are all apparently unnatural.

Schiödte's divisions are based on the method of articulation of the hind coxæ, and appear to me to be natural, sharply limited, and probably very ancient. Which of the two groups is the more generalized, however, is not easy to decide.

The following brief notes are intended to stir up some thought on the subject. I am obliged to take as granted, or very probable, certain unproved points, as this is simply a summary, but later on I hope to treat the subject in detail.

My conception of a typical, rather primitive, Heteropteron, say of late Carboniferous time, is of an insect not very distinct, perhaps, from a modern Cimicine (Asopine), such as *Cimex* (*Picromerus*) *bidens*.

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*Sharp, in reproducing Schiödte's table, places the "Capsidæ" in the Trochalopoda. No wonder that Sharp finds that "Schiödte's characters do not divide his two divisions at all sharply!"

This primitive form would, as an adult, be rather strongly and heavily built; the tegmina would be sharply divided into three areas, viz.: clavus, corium and membrane, the latter being membranous and numerously veined, the two former coriaceous. The antennæ would be 5-segmentate,† the base concealed under the head; the labium (*rostrum*) would be free, and would be composed of four segments; the tarsi would have three segments, and the metasternal glands would be very strongly developed. The nymphs would also possess well-developed stink-glands, three in number at least, and paired.

This development of the stink-glands, the sharp limiting of the membrane from the coriaceous part of the tegmina, the quadrisegmentate labium, etc., are, in my opinion, fundamental characters of a typical Heteropteron, and it is in those forms which are obviously highly modified, that any departure from the above is specially shown. Entirely membranous tegmina are found in Gerridæ and Enicocephalidæ, obviously highly-modified families. It is in the Gerridæ also, and the true water-bugs, that degeneration of the metasternal stink-glands has proceeded so far.

Osborn, in his classification, has allied the Miridæ with the Pyrrhocoridæ, the Acanthiidæ with the Gerridæ, and the Aradidæ with the Clinocoridæ, but these alliances are certainly superficial, not phylogenetic.

The classification adopted by Distant is entirely artificial, as well as inaccurate in details. He retains the discredited divisions of "Gymnocerata" and "Cryptocerata," and proceeds at first in the former by separating off the Gerridæ and the Næogeinæ, because the sternites are clothed beneath with silvery-velvety pubescence! The Cimicidæ are then separated off by the scutellum reaching at least to the base of the membrane (though this is not the case in at least some Urostylinæ), the scutellum in the other families being stated not to reach the base of the membrane, although this is certainly the case in most, if not all, Macrocephalidæ and Aradidæ. The Acanthiidæ are associated with the Reduviidæ, the Aradidæ with the Macrocephalidæ, and the Nepidæ with the rest of the Waterbugs.

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† The possession of only four segments in almost all Heteropterous nymphs may prove that the adults of my supposed primitive Heteropteron really had only the same number, but it is a matter of little consequence.

In 1907 I proposed a classification of two superfamilies in each main division, and six families in each superfamily. My friend, Dr. Bergroth (*in litt.*), suggests that in the Cimicoideæ, the Cimicidæ form a superfamily, the Tingidæ another, the remaining three families another. This is very probably more correct, but it has this objection, viz.: that its adoption would obscure the much closer mutual relationship between these three "superfamilies" than between any of them and the Nepoideæ. Since proposing the above classification, I have acquired some specimens of *Urostylis*, which was previously unknown to me in nature. This genus seems to me to be a very aberrant Cimicid, and in some respects to be more allied to the Lygæidæ. At present I propose to establish eight families in the Cimicoideæ, viz.: Cimicidæ, Cydnidæ,* Urostylidæ, Aradidæ, Lygæidæ, Pyrrhocoridæ, Myodochidæ (=Geocoridæ) and Tingidæ. The Tessaratominæ lead to the Aradidæ, the Urostylidæ to the Lygæidæ. More study of nymphal characters in Cydnidæ and Urostylidæ is needed, indeed, in all the families.

My classification may stand for the present as follows:

Superfamily I.—CIMICOIDEÆ.

1. The articulation of the antennæ with the head, concealed from above. Ova deposited externally. Nymphs, in the last instar at least, with three orifices (on the 4th, 5th and 6th tergites), the first of which is sometimes paired. [Scutellum nearly always greatly developed.]. 2.

1a. Antennæ not thus concealed. Scutellum mediocre or small.......3.

2. Abdominal segments normal. Tibiæ not spiny........1. *Cimicidæ.*

2a. Only five sternites clearly seen (exclusive of genital segments). Tibiæ spinose....................................2. *Cydnidæ.*

3. Tarsi consisting of three segments.............................4.

3a. Tarsi consisting of two segments..............................7.

4. Antennæ with five segments;† general habitus Cimicidiform [metamorphoses unknown]..........................3. *Urostylidæ.*

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*I am indebted to Dr. Bergroth for calling my attention to certain characters in this.

†I have now received a Chinese form with only four segments, which I shall describe as *Tessaromerus.*

4a. Antennæ with four segments; general habitus not Cimicidiform....5.

5. Antennæ infraoral. Ova deposited externally....................6.

5a. Antennæ almost always preoral. Membrane almost always with more than eight veins. Ova deposited externally. Nymphs with two orifices (on 5th and 6th tergites)....................7. *Lygæidæ.*

6. Membrane with more than eight veins. Nymphs with three orifices ....5. *Pyrrhocoridæ.*

6a. Membrane with five veins, or less. Nymphs with two or three orifices........................6. *Myodochidæ* (= Geocoridæ.)

7. Tegmina neither cellulate nor reticulate. Nymphs with three orifices. Ova external..........................4. *Aradidæ.*

7a. Tegmina cellulate or reticulate. Ova inserted. Nymphs with two orifices (on 4th and 5th)..........................8. *Tingidæ.*

Superfamily II.—NEPOIDEÆ.

1. Abdominal spiracles normal..................................2.

1a. Last pair of abdominal spiracles siphunculate..........14. *Nepidæ.*

2. Adults with metasternal odoriferous orifices......................3.

2a. Adults lacking the above, but with one median orifice on the fused metasternum and first abdominal sternite............11. *Gerridæ.*

3. No prosternal stridulating apparatus............................4.

3a. Well-developed stridulating apparatus on the prosternum.........5.

4. Four distinct labial segments. Membrane and coriaceous parts of the tegmina distinct, the former with numerous veins......9. *Nabidæ.*

4a. Three apparent labial segments, the true first annuliform. Tegmina entirely membranous, with few veins.........10. *Enicocephalidæ.*

5. Fore femora more or less normal, with the tibiæ, never cancriform. Nymphs with three orifices. Ova external........12. *Reduviidæ.*

5a. Fore femora enormously dilated, with the tibiæ, cancriform. Nymphs with orifices on 5th and 6th tergites only. Ova external...................13. *Macrocephalidæ* (= *Phymatidæ*).

Superfamily III.—MIROIDEÆ.

This table is not satisfactory, owing to the fact that two families are known only in the apterous state.

1. Tegminal veins never areolately joined. Third segment of antennæ not thickened towards the base..............................2.

1a. Tegmina with the veins more or less areolately joined. Third segment of antennæ thickened towards the base.............................20. *Dipsocoridæ* (= *Ceratocombidæ*).

2. Macropterous forms with incomplete cuneus, but well-developed ocelli. Head produced horizontally in front. Ova laid externally. Nymphs with three orifices..................................3.

2a. Macropterous forms with complete cuneus, ocelli obscure. Head rarely produced horizontally. Nymphs with only a single orifice (on the 4th tergite). Ova inserted in the leaves or stems of plants..19. *Miridæ.*

3. Rarely brachypterous. Clypeus elongate. Head not channelled beneath...................................15. *Anthocoridæ.*

3a. Always strongly brachypterous. Clypeus short or apparently absent. Head more or less channelled beneath.......................4.

4. Not furnished with comb-like fringes, only scattered hairs. Eyes well developed...5.

4a. Furnished with comb-like fringes. Eyes absent....17. *Polyctenidæ.*

5. Coxæ short, somewhat remote.....................16. *Clinocoridæ.*

5a. Coxæ rather elongate, subcontiguous.............18. *Æpophilidæ.*

Superfamily IV.—NOTONECTOIDEÆ.

1. Antennæ free, and more or less conspicuous. Nymphs with odoriferous orifices....................................2.

1a. Antennæ concealed, usually in foveæ on the under side of the head. Nymphs lacking odoriferous orifices.........................3.

2. First segment of antennæ reaching well beyond the apex of the head; membrane-cells lacking cross veins..............21. *Acanthiidæ.*

2a. Second segment of antennæ not extending as far as the apex of the head; membrane-cells with cross-veining..........22. *Ochteridæ.*

3. Fore legs inserted on the disk of the fore margin of the prosternum.4.

3a. Fore legs inserted on the hind margin of the prosternum..........5.

4. Antennæ more or less simple. Legs not, or scarcely, simple. Wings not reticulate. Ova laid on leaves, etc., of water-plants..........23. *Naucoridæ* (including *Mononyx*, etc.).

4a. Antennæ highly modified. Legs strongly flattened. Wings more or less reticulate. Ova laid on the back of the male..24. *Belostomidæ.*

5. Labium composed of two segments at most. The forms swim on their bellies. Ova laid externally......................25. *Corixidæ.*

5a. Labium free, composed of three or four segments. Forms swim on their backs. Ova inserted in stems, etc., of water-plants.......................... ....26. *Notonectidæ.*

Considering, then, the nymphal characters, the number of segments in the tarsi, the condition of the tegmina, and of the stink-glands, etc., it seems to me that the only families that have any claims to be considered typical are the Cimicidæ, Pyrrhocoridæ, Myodochidæ, Nabidæ and Anthocoridæ.

The Anthocoridæ are undoubtedly the most generalized of the Pagiopoda, and are probably very ancient,* but I think that the Pagiopoda are less typical, as a whole, than the Trochalopoda. The Nabidæ have less highly-developed stink-glands, and, I think, are a development of some "Protomyodochidæ" in the direction of greater rapacity and agility. The ocellated ancestors of the Pyrrhocoridæ might almost as well, however, as the Cimicidæ,† be the most typical Heteroptera. It is the fact that certain Cimicid nymphs have the first orifice paired, that leads me to propose that place for them, and it will scarcely be questioned that it is much more likely that a paired gland should become coalesced, than that a single gland should be divided in such a case.

The Heteroptera are admittedly one of the most ancient and isolated groups of insects, but they were probably much more dominant in past times than to-day. I believe that the families which are usually regarded as the "highest" are really so, but are also at the same time nearest to the typical Heteropteron of the later Paleozoic times, when it had finally separated itself from the Homoptera, and a long time since from the other Insecta.

The subjoined table shows, in some sort, my views on the probable phylogemy of the Heteroptera, but a good deal of latitude must be given to the detailed lines of descent.

The following shows my opinion as to the general relationships of the 26 families :

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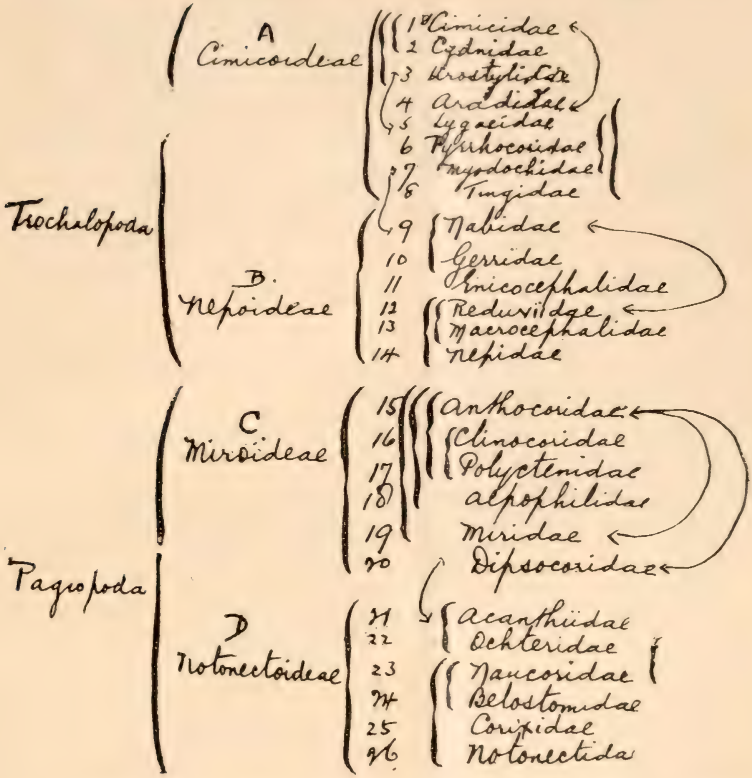
*Reuter says : "J'ai commencé mon ouvrage par la famille des *Capsides* [Miridæ], parceque celle-ci me parait être la plus basse dans le système" (Act. Soc. Sci. Fenn., XIII, 6), but this was in 1878. See the P.S. at the end of this paper.

†In selecting "Cimicidæ," I refer specially only to the Cimicinæ (= Asopinæ). The other subfamilies are mostly much more recently developed.


Trochalopoda
Pagiopoda
A Cimicoideae
B. Nepoideae
C Miroideae
D Notonectoideae
1 Cimicidae
2 Cydnidae
3 Urostylidae
4 Aradidae
5 Lygaeidae
6 Pyrrhocoridae
7 Myodochidae
8 Tingidae
9 Nabidae
10 Gerridae
11 Enicocephalidae
12 Reduviidae
13 Macrocephalidae
14 Nepidae
15 Anthocoridae
16 Clinocoridae
17 Polyctenidae
18 Aepophilidae
19 Miridae
20 Dipsocoridae
21 Acanthiidae
22 Ochteridae
23 Naucoridae
24 Belostomidae
25 Corixidae
26 Notonectida

Although this note seems to assume a good deal on rather imperfect grounds, I feel sure that it approximates more closely to the true philogeny of the insects under discussion than any of the groupings now current, and I hope that it will stir up some research and discussion on this fascinating subject.

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Sharp: Cambridge Natural History, VI, 543-4 (1901).

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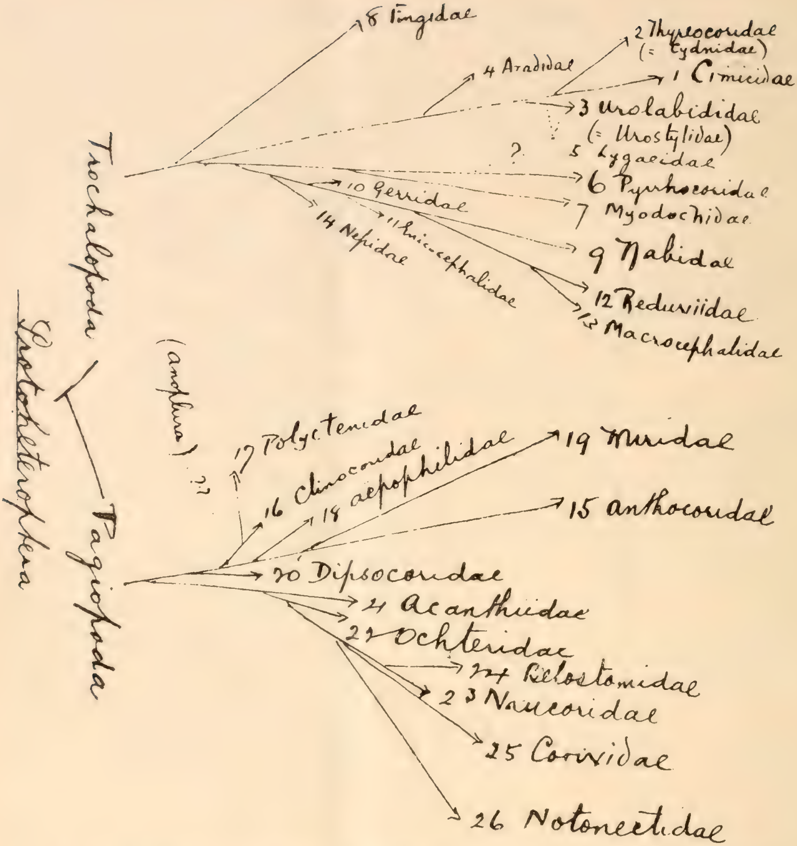

18 Tingidae
2 Thyreocoridae
(= Cydnidae)
4 Aradidae
1 Cimicidae
3 Urolabididae
(= Urostylidae)
?
5 Lygaeidae
6 Pyrrhocoridae
10 Gerridae
7 Myodochidae
11 Enicocephalidae
14 Nepidae
9 Nabidae
12 Reduviidae
13 Macrocephalidae
Trochalopoda
Protoheteroptera
(amphibia)
?!
Pagiopoda
17 Polyctenidae
16 Clinocoridae
18 Aepophilidae
19 Miridae
15 Anthocoridae
20 Dipsocoridae
21 Acanthiidae
22 Ochteridae
24 Belostomidae
23 Naucoridae
25 Corixidae
26 Notonectidae

P. S.—Some time after I had sent the foregoing notes for publication, I received, through the kindness of the author, Reuter's "Bemerkungen über Nabiden," in Mém. Soc. Ent. Belg., XV, 87-130 (1908).

Reuter does not accept Schiödte's divisions of Trochalopoda and Pagiopoda, and apparently prefers to form the preliminary divisions of the Heteroptera upon the shape of the ova. He also merges the Nepoideæ in the Miroideæ, and considers that the Nabidæ are closely allied to the Acanthiidæ and Anthocoridæ. He, however, admits that my placing of the Miridæ and Notonectidæ as terminal twigs is probably correct, and throws much light on previously obscure points.

As Dr. Reuter may perhaps rediscuss the whole question after the perusal of this contribution, I merely remark now that he has seemingly overlooked the important fact that in the Miroideæ the meso- and metapleura are composed of more than one piece each, while this is not the case in the Nepoideæ.

All through the above paper for "Cydnidæ" read "Thyreocoridæ," and for "Urostylidæ" read "Urolabididæ."

EMPHYTINÆ — NEW GENERA AND SPECIES AND SYNONYMICAL NOTES.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

The subfamily Emphytinæ as understood by the writer should be characterized as follows : the front wings with the first and second anal cells present and separate ; the second anal cell strongly contracted at middle of the hind margin ; the radial cross-vein present ; the free part of R_5 always present ; the radio-medial cross-vein usually present ; the medio-cubital cross-vein and the free part of M_{3+4} parallel ; the hind wings with the free part of R_4 and the transverse part of M_2 present or wanting ; the antennæ with nine segments.

COCKERELLONIS, n. gen.—Front wings with the second abscissa of Cu distinctly longer than the free part of M_4 ; the free part of 2nd A perpendicular ; the radial and the radio-medial cross-veins present ; the hind wings with the cell R_{1+2} with a long appendage ; the free part of R_4 and the transverse part of M_2 present ; the posterior metatarsus shorter than the four following segments ; the claws simple, without a tooth. Type, *Cockerellonis occidentalis*, MacG.

Cockerellonis occidentalis, n. sp.—Black, with the following parts reddish-yellow : the clypeus, the labrum, the mandibles except at apex, the inner margin of the eyes very narrowly, the tegulæ, the collar broadly, the wings at base and the costa, the apices of the costa, the trochanters in great part, the femora narrowly at base and apex, more pronounced on the anterior, the tibiæ except fuscous marks on the outside of the middle and posterior, the base of the tarsi, and the apex of the ventral abdominal segments ; the clypeus deeply and broadly emarginate ; the third segment of the antennæ one-third longer than the fourth ; the ocellar basin well marked and deep ; the frontal crest prominent and not interrupted ; the vertical foveæ deep, diverging behind, puncture-like, and not reaching the occiput ; the head and thorax smooth ; the stigma brownish-black ; the wings hyaline, slightly clouded, the veins black. Length, 6 mm.

Habitat.—Ruidosa Creek, New Mexico, 6,600 ft. elevation, July 1st, on fronds of *Pteris aquilina*, collected by Prof. E. O. Wooton, No. 8, received from Prof. T. D. A. Cockerell. This species was listed as *Taxonus (strongylogaster) occidentalis*, MacG., MS. by Prof. Cockerell in Trans. Kansas Acad. Sci. for 1898 (publ. 1899), page 212.

EPITAXONUS, n. gen.—Front wings with the second abscissa of Cu distinctly longer than the free part of M_4 ; the free part of 2nd A perpendicular ; the hind wings with the cell R_{1+2} with an appendage at apex; the posterior metatarsus shorter than the four following segments together; the claws with a minute erect tooth at middle. Type, *Taxonus albidopictus*, Nort.

TAXONUS, Htg.—This genus was described by Hartig in Die Familien der Blattwespen und Holzwespen, Berlin, 1837. The following species were included: *Nitida*, Klg. (= *agrorum*, Fall); *stricta*, Klg.; *bicolor*, Klg., and coxalis, Htg. (= *equiseti*, Fall), and *agilis*, Klg. (= glabratus, Fall). So far as I have been able to determine, no type has been indicated for this genus, and in order that the same group of species may be retained in the genus, *equiseti*, Fall, should be taken as type.

Taxonus montanus, MacG.—The unique male type of this species on careful study and comparison proves to be the same as *Epitaxonus albidopictus*, Nort.

Taxonus floridanus, Prov.—This is a synonym of *Pseudosiobla robusta*, Kirby.

Taxonus unicinctus, Nort.—From a careful study of all the material at hand, I have come to the conclusion that *Taxonus unicinctus*, Nort.; *Strongylogaster pallicoxus*, Prov., and *Taxonus borealis*, MacG., are all one and the same species. Norton's name is the older and should be used; the species belongs in Ashmead's genus *Strongylogastroidea*.

MONOSTEGIA, Costa.—This genus, as near as it is possible for me to determine at this time, was proposed by Costa to include *luteola*, Klg. (= abdominalis, Fab.). Fabricius's species is readily separated from *Poecilostoma* by having the claws bifurcate at apex. The name *Monostegia* is used here in its original sense, and *abdominalis*, Fab., is taken as its type.

Monostegia Martini, n. sp.—Black, with the following parts rufous: the labrum, the collar broadly, the tegulæ, the metathorax, the abdomen, the legs, and the base of the wings; the second segment of the antennæ as long as the fourth and fifth together; the frontal ridge wanting and the antennal fovea and the ocellar basin united. Length, 7 mm.

Habitat.—Westfield, Mass., J. O. Martin collector.

PHRONTOSOMA, n. gen.—Front wings with the second abscissa of Cu subequal in length to the free part of M_4; the free part of 2nd A oblique; the hind wings with the cell R_{1+2} always with a distinct appendage at apex; the posterior metatarsus never longer than the four following segments; the claws cleft, with the inner lobe not more than one-half the length of the outer lobe. Type, *Phrontosoma atrum*, MacG.

Phrontosoma atrum, n. sp.—Body black, with the tegulæ, a fine line on the collar, and all the legs beyond the apical third of the femora, white; the apex of the posterior tibiæ and the tarsi infuscated; the antennal furrow below the lateral ocelli broad and coarsely punctured; the frontal ridge wanting and the antennal fovea and ocellar basin continuous; the third segment of the antennæ as long as the fourth and fifth together. Length, 6 mm.

Habitat.—Ames, Iowa. E. D. Ball, collector.

Phrontosoma Nortoni, MacG.—This species was described in the Canadian Entomologist, 1894, XXVI, 324, as a new species of *Caliroa*.

Phrontosoma Daeckei, n. sp.—Body black, with a rufous spot covering the collar and mesonotum; the tegulæ and legs beyond the apical third of the femora, white; the third segment of the antennæ as long as the fourth and fifth together; the frontal ridge distinct and unbroken, the antennal fovea and the ocellar basin therefore not continuous; the antennal fovea as large or larger than the ocellar basin, and extending through the hypoclypeal area; the triangular depression behind the anterior ocellus not extending to the antennal furrow. Length, 7 mm.

Habitat.—Glenside, Mtg. County, Penn. E. Daecke, collector.

Phrontosoma collaris, n. sp.—Body black, with a rufous spot covering the greater part of the prothorax and the mesonotum; the third segment of the antennæ hardly as long as the fourth and fifth segments together; the frontal ridge distinct and unbroken; the antennal fovea long and distinct; the ocellar basin almost wanting; the triangular depression behind the anterior ocellus distinct and extending to the antennal furrow. Length, 7 mm.

Habitat.—Ames, Iowa. E. D. Ball, collector.

Emphytus cinctipes, Nort.—Many writers since the time of Norton have considered this species as the same as the European *Emphytus cinctus*, Linn., while the coloration is practically identical, the form of the frontal area, the shape of the saw-guides, and the dentation of the saws is entirely different, and I believe that Norton's species should be recognized as distinct.

Parataxonus, n. gen.—Front wings with the radio-medial cross-vein always present; the second abscissa of Cu always shorter than the free part of M_4; the hind wings with both the free part of R_1 and the transverse part of M_2 wanting; the posterior metatarsus never longer than the four following segments together; the claws with a large erect tooth at middle. Type, *Taxonus multicolor*, Nort.

Polytaxonus, n. gen.—Front wings with the radio-medial cross-vein always present; the second abscissa of Cu always shorter than the free part of M_4; the hind wings with both the free part of R_4 and the transverse part of M_2 wanting; the posterior metatarsus never longer than the four following segments together; the claws appendiculately toothed at base. Type, *Taxonus robustus*, Prov.

ERIOCAMPA, Hartig.—American writers have erroneously referred the species of the genus *Caliroa*, Costa, to *Eriocampa*, and the American species that belong to *Eriocampa* to Stephens's genus *Sciapteryx*. So far as I am aware the genus *Sciapteryx* does not occur in America.

Sciapteryx punctum, Prov.—This is the female of *Dimorphopteryx pinguis*, Nort.

Eriocampa rotunda, Nort.—This is the female of *Eriocampa obesa*, Say. Say described his species as an *Allantus*, and his name should have precedence.

MONSOMA, n. gen.—Front wings with the radio-medial cross-vein always present; the second abscissa of Cu always shorter than the free part of M_4; the hind wings with the free part of R_4 wanting and the transverse part of M_2 present; the posterior metatarsus never longer than the four following segments together; the head and the thorax smooth, without punctures. Type, *Poecilostoma inferentia.*

Poecilostoma albosecta, Prov. — Specimens of this species and *Poecilostoma inferentia*, Nort., are taken in this region commonly and together on Alder. Although very differently coloured, they are identical in structural characteristics; there is but little doubt that they are the male and the female of the same species.

MACREMPHYTUS, n. gen.—Front wings with the radial cross-vein present and the radio-medial cross-vein wanting; the second abscissa of Cu almost obliterated by the migration of $M_4 + Cu_1$ towards the medio-cubital cross-vein; the hind wings with the cell R_{1+2} extending to the apex of the wing, with a slight appendage at apex; the free part of R_4 wanting, the transverse part of M_2 present; the posterior metatarsus distinctly longer than the four following segments; the claws cleft, the rays subequal. Type, *Harpiphorus varianus*, Nort.

This genus is erected to include the American species referred to the genus *Harpiphorus.* This genus contains a single European species, which is readily differentiated by having the second segment of the antennæ longer than the first. The length of the posterior metatarsus in

Macremphytus also prevents its confusion not only with *Harpiphorus*, but also with the genus *Emphytus* and the genera allied to it.

STRONGYLOGASTER, Dahlb.—Dahlbom in his "*Conspectus Tenthredinidum, Siricidum et Oryssinorum Scandinaviæ quas Hymenopterorum Familias*," published in the Kongl. Svenska, Vertens. Acad. Handlg. for the year 1835, gives a list of the species of Tenthredinoidea of the Scandinavian peninsula, in which he has introduced several new names, but has not appended any descriptions. The genus *Strongylogaster* is such an one. Dahlbom included under this name *filicis*, Klg.; *mixta*, Klg., and *cingulata*, Fab. *Mixta* is congeneric with *contigua*, Knw., which belongs to the genus *Thrinax*, Knw.; *contigua* should be taken as the type of this genus. Ashmead has made *filicis*, Klg., the type of *Polystichophagus*, Ashm. This leaves only *cingulata*, Fab., for *Strongylogaster*, which becomes type by elimination. This leaves the American species of *Strongylogaster* in which the free part of 2nd A is present to be provided for; they belong to Ashmead's genus *Strongylogastroidea*, of which *Strongylogaster apicalis*, Say, is type.

Strongylogastroidea spiculatus, n. sp.—Body black, with the following parts white; the clypeus, the labrum, the four apical segments of the antennæ, the tegulæ, a very narrow line on the collar, the posterior coxæ in great part, the trochanters, and the scutellum; with the following parts rufous: the head except the ocellar and postocular areas and the lower half of the antennal furrow, the prothorax at sides, the median lobe of the mesonotum, an irregular spot on the mesopleura, the abdomen except the saw-guides, the front and middle legs beyond the middle of the femora, and the posterior tibiæ and tarsi; the anterior ocellus is situated in front of a distinct angularly diverging ridge; the saw-guides with the upper margin straight, the lower margin semi-straight, roundly and obliquely truncated and pointed at apex. Length, 11 mm.

Habitat.—Ellenville, N. Y. Chester Young, collector.

Strongylogastroidea confusa, n. sp.—Body rufous, with the following parts white: a narrow line on the collar, the scutellum and postscutellum, the apices of the coxæ, and the trochanters; with the following parts black: a spot surrounding the ocelli, a small spot on the middle of the postocular area, the lateral lobes of the mesonotum, the prothorax in great part, the pectus and the bases of the coxæ; the saw-guides concave above, convex below, the apex almost squarely truncate. Length, 9 mm.

Habitat..—West Springfield, Mass. J. O. Martin, collector.

MEIGEN'S FIRST PAPER ON DIPTERA.

BY J. M. ALDRICH, MOSCOW, IDAHO.

Johann Wilhelm Meigen (1763–1845), was, says Schiner, "Incontestibly the first and greatest dipterologist of his time and all times." He had a good perception of generic characters, and had perhaps the first really comprehensive collection of European Diptera ever made upon which to exercise his talents. Added to these favouring conditions, he must also have had immense patience and tenacity to carry out through twenty years of almost continuous publication his monumental work. "Systematische Beschreibung der bekannten europäischen zweiflügligen Insekten."

Such being the prominence and reputation of Meigen, it is not surprising that considerable attention should be given to anything written by him. The paper from which many of his principal genera have been dated, and which most entomologists have supposed to be his earliest one, is entitled, "Versuch einer neuen Gattungs Eintheilung der europäischen zweiflügligen Insekten," and was published in Illiger's Magazin für Insektenkunde, Vol. II, pp. 259–281, in the year 1803. The article has a page of introduction by the editor, Illiger, calling attention to the fact that Meigen had already prepared a large amount of material for a comprehensive work on Diptera, and bespeaking for him the necessary financial support for its publication. The article itself contains no explanatory matter by Meigen, but merely gives short descriptions of 114 genera of Diptera, mostly new, with one or more typical or illustrative species mentioned in connection with most of them ; a considerable number, however, have no species mentioned.

That Meigen had already published another paper with a similar scope is nowhere mentioned or suggested in the 1803 article, but has been known for many years. Hagen lists it in his "Bibliotheca Entomologica," although he had not seen it. It has been referred to once or twice in literature, but has remained practically unknown until recently ; now, however, Mr. Fr. Hendel has published an extended article on it in the "Verhandlungen der kaiserlichen-königlichen zoologischen-botanischen Gesellschaft in Wien," 1908, 43–69. He quotes the generic descriptions in full and gives his ideas of their meaning. His own copy and the one in Osten Sacken's collection are the only ones known to Hendel. As Hagen mentions the paper as containing forty pages, it is evident that Hendel does not give it entire, but only the part which is important for nomenclature. Not having seen the original, I am obliged to follow Hendel's data in the discussion which follows.

The title of the paper is "Nouvelle classification des Mouches á deux Ailes (Diptera L.) d'après un plan tout nouveau," and the date is "Paris an VIII," that is, the eighth year of the French Revolution, or 1800.

The work contains no mention of specific names at all in connection with the generic descriptions. The latter are brief, and in most cases in rather general terms, such as the number of joints in the antennæ, presence or absence of ocelli and tibial spurs, whether the wings are folded or divaricate in repose, etc. It is not to be denied, however, that occasional decisive characters are found, but not in many genera.

Hendel had great difficulty, as he admits, in determining the meaning or application of these generic names, until he received from Bezzi the happy suggestion that the 1803 paper contains most of the same matter translated into German, hence a comparison of the two would reveal the identity of the earlier ones. Following this out Hendel was enabled to trace the connection, and thus he learned that Meigen had changed nearly all of his generic names in 1803 from those he proposed in 1800. For instance, Flabellifera became Ctenophora; Petaurista became Trichocera; Zelmira, Platyura; Fungivora, Mycetophila; Lycoria, Sciara; Helea, Ceratopogon; Tendipes, Chironomus; Eulalia, Odontomyia; Noeza, Hybos; Clythia, Platypeza, and many others.

A glance at the names mentioned will indicate that Meigen had in the interim adopted a new principle in the formation of generic names, changing from Latin or Latin-sounding words to those derived somewhat rigorously from Greek roots. It is possible that he was troubled with doubts as to whether any generic term would "stand" if not derived from Greek; at any rate, the nature of the changes indicates what was his purpose.

Now, a few words as to the effect upon nomenclature of this newly-opened chapter of entomological history. Mr. Hendel asserts that the older names, as ascertained by the method of comparing the German translation of the 1800 paper with the 1803 paper, must replace the latter *in toto*, taking as types those assigned in 1803. He says, "As the reader of the following pages will observe, the acceptance of the old names of Meigen will create a complete revolution in dipterological nomenclature; this is, indeed, to be regretted, but is unfortunately unavoidable. *Fiat justitia, pereat mundus!*"

I am so far from coinciding in my views with Mr. Hendel that I must confess that the simplicity of his position is absolutely laughable.

I do not approach the question with the idea that two sets of names stand before the bar of justice with exactly equal claims upon our decision. The case is more nearly analogous to one that has several times arisen within a generation in the United States, when some persons have endeavoured to claim valuable tracts of real estate on the basis of transfers from Indian tribes a century or so ago. Even if the original transaction had occurred as claimed, the contestants will find that every possible presumption will be used against them, and justly so, to avoid the great practical wrong and hardship of upsetting titles to real estate. So in this case we ought to have no hesitancy in admitting that our attitude is that no old names like these can create a "revolution" unless they exhaust every legal technicality that we can throw in their way. This is not an unfair position. It does not involve an ultra-conservatism, nor does it involve a disregard of proper or generally-accepted rules of nomenclature. It does involve some comprehension of the value of stability in nomenclature, a subject on which many entomologists might cogitate long with profit.

Mr. Hendel does not cite any rules of nomenclature to justify his acceptance of the 1800 names. I will cite one to show why they should not be accepted ; namely, article 25 of the International Code of 1904, which says, "The valid name of a genus or species can be only that name under which it was first designated on the condition (a) that this name was published and accompanied by an indication, or a definition, or a description ; and (b) that the author has applied the principles of binary nomenclature."

Following this rule, I note as applying to (a) above, that the names in 1800 were not accompanied by an indication, and the definition or description (these two are practically synonymous terms) were as admitted by Hendel unrecognizable (with possibly a few exceptions) until studied in the light of the 1803 paper ; they were therefore *nomina nuda*. Condition (a) was therefore not fulfilled in 1800. As to condition (b), if the author of a paper mentions only genera and no species, he does not apply a binary nomenclature.

Furthermore, Dr. Stiles gives as his individual rule (in his comments on the International Code, Hygienic Laboratory, Bull. 24, p. 27) : "12a Rule.—The following species are excluded from consideration in selecting the types of genera: (a) Species which were not included under the generic name at the time of its original publication." These names, therefore, have no types.

I should not deem the occasion to justify so lengthy a discussion on my part, but for the fact that Dr. Bezzi writes me that he is engaged on a research into the names proposed in Diptera prior to 1800, and that he has already found data sufficient to require the change of the great majority of names of the older genera now in use in the Diptera. A number of his conclusions have already been published. We seem to be entering upon a period of nomenclatural unrest, which may leave us as badly off in Diptera as we now are in Lepidoptera or Hemiptera, to say nothing of Orthoptera and a few others.

"Let justice be done, though the earth perish," says Mr. Hendel. But justice means nothing, except with reference to some person or thing. Justice to whom, or to what? Is it justice to Meigen to insist on the use of names that he himself discarded for better ones? Or is it justice to dipterology to overturn nomenclature to no purpose? The case before us is not Meigen versus some other ancient worthy, but Meigen versus Meigen. Justice to him has already been done, and it would be flagrant injustice to reopen the case.

PLATYSAMIA COLUMBIA NOKOMIS.

The handsome moth which occurs throughout Manitoba and the Northwest Provinces, and which has always been named in collections, *Samia columbia*, Smith, has such a different appearance from the Ontario form which seems to be the type, that I am of the opinion the name given by Dr. W. Brodie some years ago ought to be recognized. Dr. Henry Skinner has also examined this insect critically during the past summer, and agrees with me that Dr. Brodie's description which appeared in the Biological Review of Ontario for October, 1894, pp. 103–107, should be republished. This publication is not now available, and with Dr. Brodie's consent I send herewith an extract from his article on *Platysamia columbia nokomis.*—JAMES FLETCHER, Ottawa.

"PLATYSAMIA COLUMBIA NOKOMIS.

"BY WM. BRODIE.

"In the CANADIAN ENTOMOLOGIST, Vol. X, March, 1878, there is a very good coloured lithograph of the larvæ of *P. columbia*, by the late G. J. Bowles, and a short paper by the late F. B. Caulfield, giving a description of the larvæ. There is also on page 43 an article by C. H. Fernald, in which he gives several food-plants, a description of the egg, of the larvæ in the several stages of development, and some valuable general information. Up to this time very little had been published as to the geographical range of the species.

"In the spring of 1882 I received a parcel of *columbia* cocoons, collected by W. G. A. Brodie near Carberry, Manitoba. They were attached to twigs of the *Elæagnus argentea*, and I was informed the larvæ must have fed on the leaves of this shrub. When the imagoes emerged, they differed so much from Muskoka specimens that I fancied there must be a specific difference, and so I sent specimens of the moth and of the cocoons to the late Hy. Edwards. He did not know *E. argentea* as a food-plant of *P. columbia*. He remarked the difference between the northern form sent by me and the usual form, and thought, if permanent, it was at least sub-specific; and he suggested that it should be described and named.

"Early in 1883 I received a package of cocoons of *P. columbia* and of *T. polyphemus*, collected by W. G. A. Brodie near Pelly, N.-W. T. Only one imago emerged from this lot, from a *P. columbia* cocoon, and it differed so very much from the Manitoba form that I considered it a well-marked variety, being much less in size and of much brighter colours, and the boundaries of the colours much more distinct. All these facts and descriptions of the two forms were embodied in a paper which I read before a meeting of the Natural History Society of Toronto, and I also submitted type specimens of the two forms. For the Carberry form I proposed the name *P. columbia nokomis*, and for the Pelly form *P. columbia winonah*.

"It would appear that the *nokomis* type is generally distributed over the Province of Manitoba, and that the common food-plant is *Elæagnus argentea*, and that probably *Shepherdia argentea* (Wolf Willow) may also be a food-plant. I do not know the northern nor the western limit of *E. argentea*, but Mr. Jas. M. Milne, who was on the Government survey, has informed me that he has found the shrub on the eighth base line, which lies to the north of the South Saskatchewan, and as far west as the cactus hills, and there can be little doubt that the range of *P. columbia nokomis* is co-terminous with the range of this food-plant, *E. argentea*.

"The food-plants of the southern form *(P. Columbia)* in Ontario, Quebec and in the State of Maine, so far fairly well identified, are *Prunus virginiana*, *Prunus pennsylvanica*, *Nemopanthes canadensis*, *Kalmia angustifolia, Rhodora canadensis*, *Salix* sp., *Abies nigra*, *Larix americana*.

None of these are allied botanically to *E. argentea*, but I think it most likely that the larvæ would take very kindly to the leaves of our common *Shepherdia canadensis*.

"On comparing a series of specimens of *columbia* with *columbia nokomis*—the Manitoba form—the difference is very obvious in the brighter colours and more sharply-defined colour areas. This difference may be in some measure from a difference of food, or from the much longer duration of daylight while the larvæ are feeding, or perhaps in part from the lower temperature in winter. And perhaps it may yet be shown that the North and Northwest Territorities are the normal habitat and *nokomis* the normal form of the species, differentiated ages ago from *cecropia* by climatical and other conditions, and that the now southern form is from degenerate stragglers from the north.

"The following points of difference may be noted between the *columbia nokomis* form and the *columbia* form, as represented by Ontario specimens, and as compared with Smith's description of *columbia*, parts of which are given in brackets. The standard of colour is Ridgeway's Nomenclature of Colours.

"Antennæ, central shaft, bright reddish-brown ; pectinations, darker (black) ; palpi, light liver-brown (dark maroon brown) ; dorsum of thorax, bright reddish liver-brown, with a posterior pure white band (dark maroon, with a short, gray band) ; under side of thorax, reddish liver-brown (black) ; legs, reddish brown, pile darker (black, slightly tinged with brownish) ; abdomen with alternate annulations, bright liver-brown and pure white (black and dirty white).

"Primaries above with a rather sharply-elbowed pure white line (grayish-white) ; the middle area of the wing is bright reddish liver-brown (dark brown), and contains a central ovate white spot (triangular) ; this bright coloured area is separated from the costa by a moderately wide longitudinal grayish stripe.

"Secondaries with a large white spot at the shoulder (small, dirty white) ; the central area bright reddish liver-brown (dark brown), having a central white spot, which varies from kidney form to curved pear form, and varying much in size, but always larger than the corresponding spot on the primaries ; but no sexual difference could be observed, either in the size or in the form, of these central white spots.

"The primaries beneath have the space from the shoulder to the median white cross band of a maroon-brown (black), and generally the under side of the wings of *columbia nokomis* is brighter coloured than that of *columbia*.

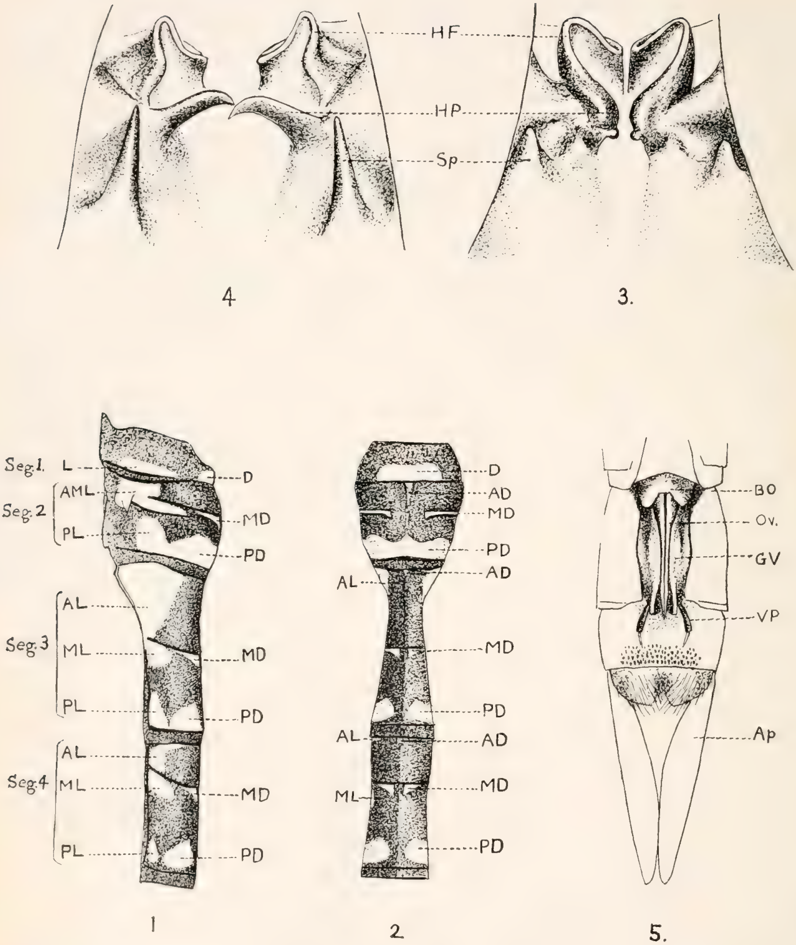
"As I have seen but one specimen of the *columbia winonah* type, little need be said about it. My specimen may have been representative of an extreme northern group, or it may have been only a strongly-marked specimen of *columbia nokomis*."

BOOK NOTICE.

ANNOTATED CATALOGUE OF ORIENTAL CULICIDÆ. By E. Brunetti, Records of the Indian Museum, Vol. I, part 4, No. 25, pages 297 to 377, December, 1907, Calcutta.

The author begins by stating that his work is a compilation only, and that he has not especially studied mosquitoes. Nevertheless, he presents an original classification of Culicidæ, dividing them into four subfamilies, in reality but three, omitting the Corethrinæ, to conform to our conception of the group. The subfamilies are not defined, but an inspection of their contents indicates that the separation has been made on the basis of the relative lengths of the palpi in the two sexes, thus: palpi long in both sexes = Anophelinæ; long in the ♂, short in the ♀ = Culicinæ; short in both sexes = Ædeomyinæ. Truly, the mosquitoes are an unfortunate group, since their primary divisions are still based on secondary sexual characters, such as we are no longer disposed to admit for genera even, and even so on modifications of the length of palpi, not in any structural difference of these plastic organs. It is a pity that this unscientific classification should still be perpetuated in the literature. Otherwise our author closely follows Theobald's classification, as, indeed, he must, no other author having covered the ground independently. References are given to every species, with a few notes and full localities, largely compiled, though we note a few original data. Two hundred and twenty-six species are listed, exclusive of the Corethrinæ. A number of species are mentioned which have been omitted by Theobald. Accompanying our copy is a sheet of "errata et addenda," dated March, 1908, with the following naive heading: "Il faut regarder ces notes comme des Additions en Manuscrit parce qu'elles ne sont pas actuellement publiées." Probably the sheet accompanies only the author's separates, but is nevertheless clearly "published," being printed and distributed and obtainable from the author.—HARRISON G. DYAR.

Mailed October 2nd, 1908.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AESHNA JUNCEA AND INTERRUPTA. (See page 391.)

The Canadian Entomologist.

VOL. XL. LONDON, NOVEMBER, 1908. No. 11.

A KEY TO THE NORTH AMERICAN SPECIES OF AESHNA FOUND NORTH OF MEXICO.

BY E. M. WALKER, TORONTO.

Although nearly two years have elapsed since the writer commenced a critical study of the North American species of the Odonate genus *Aeshna*, Fabr., it will be some time yet before the work is completed. This delay has been chiefly due to the length of time required for the execution of the numerous illustrations and for obtaining a proper field knowledge of the various species, and also to difficulties experienced in collecting and rearing the nymphs.

This being the case, it was decided to issue in advance an analytical key to the species treated in the revision in order that, in the interval, species may be listed or otherwise referred to under the names employed therein.

It has been necessary to draw up a separate key for the determination of the females, as the chief diagnostic characters of the males are found in the superior appendages and accessory genitalia. This key to the females is largely artificial, and it has been very difficult to find reliable characters for the separation of some of the species, although with experience they can almost always be recognized at a glance. Of some of the species I have seen very few females, and it is very probable that with sufficient material some of the characters used will prove invalid.

A few of the terms employed in the key require special notice. The terms hamular process and hamular fold designate respectively the more superficial and deeper parts of the anterior hamules, and are sufficiently well indicated in figs. 2 and 3 on the plate.

As the colour pattern is of the same type throughout the genus as represented in North America, it has been found convenient to apply special names to the different bands and spots which characterize this pattern.

The name dorsal thoracic band requires no explanation. The first and second lateral thoracic bands are two oblique pale bands on the sides of the mesepimeron and metepimeron respectively. The names used to designate the abdominal spots are given in the explanation of the plate, and in the key these are referred to under the same abbreviations as are used to indicate them on the plate.

KEY TO THE NORTH AMERICAN SPECIES OF AESHNA.

1. Males.

A. Anal triangle 3-celled; spine of the anterior lamina well developed, directed caudad and curved more or less cephalad.

  B. A distinct spinulose ventral tubercle on abd. seg. 1; dorsum of seg. 10 with a median basal tooth-like elevation; superior appendages with a well-developed superior carina.

    C. A black line on the fronto-nasal suture; superior appendages not apically forked, the apices obtusangulate or rounded; superior carina not angulate nor denticulate: inferior appendage somewhat less than half as long as the superiors . . . . 1. *californica* Calvert.

    CC. No black line on the fronto-nasal suture; superior appendages in profile apically forked, the apices acute and decurved, superior carina angulate; inferior appendage distinctly more than half as long as the superiors . . . . (*multicolor* group).

      D. Abdomen (excl. appendages) nearly or quite four times as long as the thorax (excl. prothorax); ventral tubercle on seg. 1 but little elevated; superior appendages about five times as long as their greatest width, inferior subbasal tubercle at one-sixth to one-seventh the length of the appendage; height of superior carina above outer margin, in profile, much less than depth of appendage directly below it, its length rather less than one-third that of the appendage;

outer side of anal loop in hind wings about as long as inner side of triangle ....2. *mutata* Hagen.

DD. Abdomen (excl. appendages) less than three and one-half times as long as thorax; a prominent ventral tubercle on seg. 1; superior appendages about seven times as long as their greatest width, inferior subbasal tubercle at one-fourth to one-fifth the length of the appendage; height of superior carina above outer margin, in profile, not less than depth of appendage directly below it, its length distinctly more than one-third that of the appendage; outer side of anal loop in hind wings longer than inner side of triangle ......3. *multicolor* Hagen.

BB. Abdominal seg. 1 without a ventral tubercle; segment 10 without a median dorsal tooth; superior appendages without a superior carina, not apically forked, but with an anteapical inferior spine, the apices broad and rounded..............................(*cyanea* group).

E. A black line (rarely absent) on the fronto-nasal suture; face pale yellowish; dorsal thoracic bands 1 mm. or less broad, tapering somewhat towards each end, or sometimes suddenly expanded at the extreme posterior end; lateral thoracic bands nearly straight and equal; spots on abdomen blue, of moderate or large size, PD on seg. 9 distinctly more than one-half as long as the dorsum of the segment; lateral carina of seg. 7 in ventral view slightly or not at all sinuate; generally one cell between A_1, at its origin and the anal triangle.................4. *palmata* Hagen.

EE. No black line on the fronto-nasal suture; dorsal thoracic bands rapidly widening caudad so as to be triangular in form with the base just in front of the antealar sinus; generally two cells between A_1, at its origin, and the anal triangle.

F. Face rather dark olivaceous; lateral thoracic bands rather narrow (about 1 mm.), straight, not widening above, nearly surrounded by a margin darker than the ground colour of the thorax; abdominal spots mostly smaller than usual, more or less greenish, PD on seg. 9 less than one-third as long as the dorsum of the segment; a pair of large pale bluish basal spots on the ventral surface of segs. 4, 5 and 6; lateral carina of segs. 7 and 8 in ventral view strongly sinuate in its anterior two-fifths . . 5. *umbrosa*, n. sp.

FF. Face pale greenish-yellow; lateral thoracic bands broader, not surrounded by a dark margin, widening above the middle margins of the first band, especially the anterior, distinctly sinuate; spots of the abdomen well developed, mostly blue, PD on seg. 9 more than one-half as long as the dorsum of the segment; ventral surface of abdomen without pale spots; lateral carina of seg. 7 at most very feebly sinuate in ventral view . . . . 6. *constricta* Say.

AA. Anal triangle 2-celled; spine of the anterior lamina directed ventrad.

G. Hamular process continuous with hamular fold (Pl. X, fig. 3), spine of the anterior lamina short and blunt, projecting very little, if at all, below the general level of the ventral surface . . . . (*clepsydra* group).

H. A black line on the fronto-nasal suture; hamular processes short and broad, directed mediad and ventrad.

I. Lateral thoracic bands each divided into a superior and inferior spot; dorsal thoracic bands reduced to a pair of small elongate spots narrowed at both ends and not reaching the antealar sinus; superior appendages with the inner margin distinctly sinuate in dorsal view, the apices rounded or bluntly angulate, seldom with a terminal tooth, superior carina minutely denticulated or smooth . . . . 7. *interrupta*, n. sp.

II. Lateral thoracic bands not divided.

J. Dorsal thoracic bands reduced to a pair of small pale, often almost obsolete, streaks, which do not nearly reach the antealar sinus; lateral thoracic bands not more than 1 mm. broad, nearly or quite straight.

K. Superior appendages with a low basal tubercle on the ventro-internal surface (best seen in an oblique view from above); inner margin in dorsal view gently sinuate, in profile slightly concave before the middle, beyond which it forms a prominent more or less obtusangulate inferior carina; breadth at middle about twice that of the extreme base, thence narrowing gradually to the more or less acute apices, which terminate in a small spine; superior carina moderately elevated before the apex, with a few minute denticles; inferior appendage about three-fifths as long as the superiors; lateral thoracic bands about 1 mm. broad below, narrower above . . . . 8. *interna*, n. sp.

KK. Superior appendages without any indication of a ventro-internal basal tubercle.

L. Lateral thoracic bands linear, their breadth less than .75 mm.; inner margin of superior appendages in dorsal view very gently sinuate, in profile straight or slightly convex before the middle, the inferior carina rather low, its angle rounded or obsolete ; breadth of appendage at middle scarcely twice that at the extreme base, thence narrowing gradually to the rounded or bluntly angulate apices, which do not normally bear a terminal tooth ; superior carina but little elevated, finely denticulated or smooth ; inferior appendage three-fifths to two-thirds as long as the superiors . . . . 9. *lineata*, n. sp.

LL. Lateral thoracic bands about 1 mm. broad near the lower end, somewhat narrowed at the middle ; inner margin of superior appendages in profile slightly concave before the middle, in dorsal view strongly sinuate, the breadth of the appendage increasing rapidly from the basal fourth, so that at the middle it is fully twice as broad as at base, thence scarcely narrowing to the well-rounded apices, which bear near the outer margin a prominent tooth ; inferior appendage slightly more than half as long as the superiors . . . 10. *nevadensis*, n. sp.

JJ. Dorsal thoracic bands well developed, expanded and truncate at the upper end, which is just in front of the antealar sinus; lateral thoracic bands more than 1.5 mm. broad, the first band deeply sinuate in front, the second more or less triangular.

M. Hind wing 43–48 mm.; no antehumeral spot; upper end of first lateral thoracic band not bent forwards; spots between first and second bands small and inconspicuous; superior appendages expanding almost symmetrically from the base; the inner margin in dorsal view not sinuate, apices rounded, normally without a terminal spine; outer margin in profile curved or bent upwards, both cephalad and caudad; superior carina rather strongly elevated in the apical fourth, bearing 6 or 8 well-marked denticles......... 11. *eremita* Scudd.

MM. Hind wing 39–42 mm.; a large triangular antehumeral spot immediately in front of the inferior part of the first lateral thoracic band, the upper and narrower end of which is bent sharply forward; spots between first and second lateral bands unusually large; superior appendages expanding unsymmetrically, the inner margin being distinctly sinuate, the distal three-fifths equal, apices tapering rather abruptly and terminating in a well-marked slightly decurved spine; outer margin in profile nearly straight throughout; superior carina slightly elevated apically, bearing 3 to 5 small denticles. 12. *clepsydra* Say.

HH. No black line on the fronto-nasal suture.

N. First lateral thoracic band not tapering regularly dorsad, its anterior margin distinctly, usually strongly, sinuate; PD always present on abdominal seg. 10; superior appendages without a prominent inferior basal tubercle.

O. Larger and relatively stouter species (abdomen 49–55 mm., hind wing 43–48 mm.); lateral thoracic bands blue, sometimes partly green, the anterior margin of the first band very deeply sinuate or angularly excavated; superior appendages expanding almost symmetrically from the base, the inner margin in dorsal view not sinuate, apices normally rounded, not at all decurved, and without a terminal spine; superior carina rather strongly elevated in the apical fourth, bearing 6 or 8 well-marked denticles; a low rounded subbasal inferior eminence present; hamular processes directed mediad, short and broad, with a slender apical tubercle .... 11. *eremita* Scudd.

OO. Smaller and slenderer species (abdomen 42–45 mm., hind wing 39–42.5 mm.); superior appendages expanding unsymmetrically from the base, the inner margin in dorsal view distinctly sinuate; superior carina moderately elevated, apices acute, somewhat decurved, with a distinct terminal spine.

P. Lateral thoracic bands blue or green, the first generally green below, blue above, its anterior margin almost rectangularly sinuate; superior carina of the superior appendages with a few denticles, apices rather abruptly decurved; hamular processes rather long, directed cephalad, subparallel, with the tips somewhat convergent; PL typically represented on abdominal segments 2–6............ 13. *canadensis*, n. sp.

PP. Lateral thoracic bands yellowish-green, the anterior margin of the first obtus-angularly sinuate; superior carina of the superior appendages not denticulated, apices gently decurved; hamular processes directed mediad and ventrad, each consisting of a stout proximal and a slender distal part; PL typically represented on abdominal segs. 2–4 ...... 14. *verticalis* Hagen.

NN. First lateral thoracic band tapering regularly dorsad, its margins nearly straight; abdominal seg. 10 without pale spots; superior appendages with a prominent inferior basal tubercle, expanding unsymmetrically from the base, the inner margin in dorsal vein distinctly sinuate; superior carina moderately elevated, not denticulated, the apices rounded, with a small terminal spine.................. 15. *tuberculifera*, n. sp.

GG. Hamular process separate from the hamular fold (pl. X, fig. 4); spine of the anterior lamina long, generally sharp-pointed, projecting well below the general level of the ventral surface; a black line always present on the fronto-nasal suture.

Q. Lateral thoracic bands more than 1 mm. broad, not sigmoid; hamular processes long, slender and spine-like, directed ventrad and mediad; superior carina of the superior appendages not denticulated, apices acute............................ (*juncea* group).

R. Lateral thoracic bands straight and subequal; hamular folds fairly well developed, widely separated, plainly visible in a vertical view from beneath .... 16. *juncea* L.

RR. Lateral thoracic bands with the anterior margins obtusangularly excavated, the first band slightly bent a little above the middle; hamular folds very small, less widely separated, and almost concealed in a vertical view from beneath by the overlapping hamular processes......... 17. *subarctica*, n. sp.

QQ. Lateral thoracic bands less than 1 mm. broad, the first one sigmoid or bent by alternate angles; hamular processes broad, flat, triangular, with the inner margins closely approximate, the apices directed cephalad; superior carina of the superior appendages more or less denticulated .... (*caerulea* group).

S. Spine of the anterior lamina distinctly longer than the hamular processes, slender, curved ventrad, sharp pointed; distance from hind margin of occiput to frontal vesicle 2.5 mm.; MD small, triangular, yellowish ....18. *sitchensis* Hagen.

SS. Spine of the anterior lamina not longer than the hamular processes, rather stout, straight, bluntly-pointed; distance from hind margin of occiput to frontal vesicle less than 2 mm.; MD large, subquadrate, more or less bluish ....19. *septentrionalis* Hagen.

2. Females.

A. Abdominal segment 1 with a distinct ventral spinulose tubercle.

B. A black line on the fronto-nasal suture; length of abdomen (excl. appendages) 36–38 mm ....1. *californica* Calvert.

BB. No black line on the fronto-nasal suture; length of abdomen more than 40 mm.

C. Abdomen about four times as long as the thorax (excl. prothorax); ventral tubercle on seg. 1 but little elevated; appendages 7 mm. long, lateral thoracic bands widening above; A_2 arising opposite or distal to the last cubito-anal cross-vein before the subtriangle; outer side of anal loop of hind wing about as long as inner side of triangle..........................2. *mutata* Hagen.

CC. Abdomen less than four times as long as the thorax; a prominent ventral tubercle on seg. 1; appendages 5–6 mm. long, lateral thoracic bands subequal; A_2 arising proximal to the last cubito-anal cross-vein before the subtriangle; outer side of anal loop of hind wing longer than inner side of triangle............3. *multicolor* Hagen.

AA. Abdominal segment 1 without a ventral spinulose tubercle.

D. Basal plate of ovipositor not bilobed, posterior margin straight or slightly convex; PL generally connected with PD on abdominal segs. 2–4 (often separate in *Ae. umbrosa*), usually smaller than the latter.

E. Genital valves 4 mm. or more in length; valvular processes as long as dorsum of seg. 10 (2 mm.); appendages rarely less than 2 mm. broad; proximal third broad with convex margins, expanding rapidly, so that the greatest breadth is reached before the middle, distal half gradually tapering to a more or less acute apex; no black line on the fronto-nasal suture.

F. First lateral thoracic band with the front margin distinctly sinuate, the upper end giving off caudad a small spur; second band suddenly expanding at upper end; length of abdomen without appendages less than 45 mm., of ovipositor 6 mm., of appendages 6–7.5 mm.; apices acute ....6. *constricta* Say.

FF. First lateral thoracic band with the front margin straight, or nearly so, gradually tapering dorsad, not giving off a distinct posterior spur; second band not suddenly widened above; length of abdomen 45 mm. or more, of ovipositor rather less than 5 mm., of appendages 7.5–9.5 mm.; apices acute or somewhat rounded. 15. *tuberculifera*, n.sp.

EE. Genital valves less than 4 mm. long; valvular processes much shorter than dorsum of 10; appendages less than 2 mm. broad and, except in *Ae. sitchensis*, slender, the margins nearly straight in the proximal third, broadest beyond the middle, the apices rounded.

G. Abdomen at least 40 mm. long; first lateral thoracic band never sigmoid nor bent by alternate angles.

H. A black line on the fronto-nasal suture.

I. Lateral thoracic bands each divided or very nearly divided into a superior and an inferior spot.... 7. *interrupta*, n. sp.

II. Lateral thoracic bands entire.

J. Lateral thoracic bands nearly straight, the anterior margin of the first band not distinctly sinuate.

K. Lateral thoracic bands somewhat more than 1 mm. broad, yellow; ovipositor 4 mm. long; genital valves with tips elevated ...4. *palmata* Hagen.

KK. Lateral thoracic bands not more than 1 mm. broad, generally pale bluish, rarely yellow; ovipositor 3.3 mm. long; tips of genital valves not elevated.

L. Lateral thoracic bands about 1 mm. broad.. 8. *interna*, n. sp.

LL. Lateral thoracic bands linear, generally less than .75 mm. broad.. 9. *lineata*, n. sp.

JJ. Lateral thoracic bands broad, the first with the anterior margin strongly sinuate, narrowed about the middle, the second expanding dorsad, more or less triangular.

M. Larger, stouter species; hind wing 45–46.5 mm. long; no antehumeral spot; first lateral thoracic band greatly constricted near the middle by a deep excavation of the anterior margin, upper end not bent forwards; spots between first and second bands small and inconspicuous .....11. *eremita* Scudd.

MM. Smaller, slenderer species; hind wing 40–42 mm. long; a conspicuous triangular pale antehumeral spot just in front of the lower and broader part of the first lateral band, the upper end of the latter narrow and sharply bent forward ; a large pale spot, including the spiracle, and another above it . . . . 12. *clepsydra* Say.

HH. No black line on the fronto-nasal suture.

N. Lateral thoracic green or yellowish-green (rarely blue) not margined with black, the anterior margin of the first band distinctly sinuate, the second band elongate triangular ; PD on 2–5 at least 1 mm. long ; ovipositor 3 mm. long ; tips of genital valves not elevated.

O. First lateral thoracic band with the anterior margin almost rectangularly sinuate, its upper end giving off caudad a very narrow spur ; posterior (postero-inferior) margin of second band generally curved ventrad at the upper end ; appendages usually 5–6 mm. long (rarely 6.7 mm) . . . . . . 13. *canadensis*, n. sp.

OO. First lateral thoracic band with the anterior margin obtusangularly sinuate, its upper end giving off caudad a rather broad spur ; posterior margin of second lateral band straight ; appendages 7 mm. long . . . . . . 14. *verticalis* Hagen.

NN. Lateral thoracic bands bright yellow, margined with black or dark brown, about 1 mm broad, straight, the first band expanded a little below, but not at all sinuate, the second band with the margins subparallel ; abdominal spots small, PD being on all the segments less than .5 mm. long; ovipositor 3.5 mm.; tips of genital valves elevated.......... 5. *umbrosa*, n. sp.

GG. Abdomen not more than 38 mm. long; first lateral thoracic band narrow, sigmoid, or bent by alternate angles; a heavy black line on the fronto-nasal suture.

P. Distance from posterior margin of occiput to frontal vesicle at least 2.5 mm.; appendages slightly longer than the dorsa of segs. 9 + 10, a little more than 1 mm. broad, tapering equally at base and apex, the latter distinctly though bluntly pointed. 18. *sitchensis* Hagen.

PP. Distance from posterior margin of occiput to frontal vesicle about 1.5 mm.; appendages about as long as segs. 9 + 10; more slender proximally than distally, the apices rounded or broadly and obscurely pointed .... 19. *septentrionalis* Hagen.

DD. Basal plate of ovipositor distinctly bilobed (pl. X, fig. 5); PL separate from PD (sometimes narrowly connected on seg. 2), as large as the latter on segs. 2–5; a black line always present on the fronto-nasal suture; lateral thoracic bands yellow or greenish-yellow.

Q. Appendages distinctly shorter than segs. 8 + 9 (5 mm. or less); margins of lateral thoracic bands nearly straight, first band gradually tapering to the upper end, without a distinct posterior spur .... 16. *juncea* L.

QQ. Appendages about as long as segs. 8 + 9 (6–6.5 mm.); lateral thoracic bands with their anterior margins obtusangularly excavated, but not sinuate, posterior margins nearly straight; first band gently widening above the middle to the upper end, from which a narrow posterior spur is given off................ 17. *subarctica*, n. sp.

Unknown .... 10. *nevadensis*, n. sp.

EXPLANATION OF PLATE.

Fig. 1, 2. *Aeshna juncea* L, ♂, abdominal segments 1–4. 1, lateral; 2, dorsal view.

D, dorsal spot of segment 1.
L, lateral " "
AL, anterior lateral spot.
ML, middle " "
PL, posterior " "
AML, the homologue of AL + ML on seg. 2.
AD, anterior dorsal spot.
MD, middle " "
PD, posterior " "

" 3. *Aeshna interrupta* Walk. ♂, anterior hamules.
HF, hamular fold; HP, hamular process; Sp., spine of the anterior lamina.

" 4. *Aeshna juncea* L, ♂. Letters as in Fig. 3.

" 5. *Aeshna juncea* L. ♀, ventral aspect of abdominal segments 9 and 10; Ov, ovipositor; BO, basal plate of ovipositor; GV, genital valve; VP, valvular process; Ap., appendage.

(To be continued.)

NOTES ON SOME SOCIETY ISLAND MOSQUITOES.

BY R. W. DOANE, STANFORD UNIVERSITY, CALIF.

During a short stay in July and August on Tahiti, Morea and Tetioroa I found the mosquitoes very troublesome, particularly so in the dense growth where one could not get the sea breeze. I had not time to make any particular study of the species occurring there, but the following notes on the three species that I met with may be acceptable to those interested in the group.

Stegomyia calopus, Meig., and *S. scutellaris*, Walk., are the two common day mosquitoes, occuring in the houses and out of doors everywhere. They breed together in standing, sometimes rather foul, water. I have seen the larvæ by the millions in the small drainage gutters along the streets of Papetee. No effort is made to control them, although one man told me that at some seasons the mosquitoes were so bad in places that people took refuge in their beds to escape the pests. All the beds are provided with a canopy of mosquito netting, but there are no screens on the doors or windows.

With the opening of the Panama Canal and the consequent short and frequent passage of ships from that region to all of these Pacific islands, the yellow fever is almost sure to be introduced there unless extraordinary precautions are taken to prevent it. Under the present sanitary conditions it would be impossible to control the disease once it gained a foothold. However, after the French officials learned that *S. calopus* was one of their most common mosquitoes, they said that steps would probably be taken to control them, at least in Papetee. As an example of how easily relief may be had in some instances I may give my experience on Tetioroa. The first day there I was badly pestered by the great number of these mosquitoes in the little native hut that had been assigned to me as my laboratory. A brief search around the premises showed that the water in the tanks that were used for storing rain-water was swarming with mosquito larvæ. Less than half a pint of kerosene served to treat this source of supply, and I experienced but little trouble after that about the laboratory.

While these two species are principally day feeders, they will occasionally bite at night after the lamps have been lighted. Usually, however, they are satisfied with their day's work and give way to the no less annoying or less dangerous night-flying species, *Culex fatigans*, Wied. If one happens to be sleeping out of doors or in a bed provided with only a poor screen, the low, sharp buzz and the vicious bite of these pests make sleep almost impossible. Or if disturbed sleep does come, it is only to dream of an arm or a leg swelling to horrible proportions, for one knows that any one of these mosquitoes as she bites may be transplanting to one's blood some of the filaria derived from a former meal on some of the elephantiasis patients who have been seen during the day.

Elephantiasis is quite a common disease on Tahiti and Morea. On the latter island it is said to be much more common on the lee side, where there is more low marsh land, than on the more rugged windward side.

The larvæ of *C. fatigans* are found in the same situations and often in the same pools as *S. calopus* and *S. scutellaris*. In a dipperful of water from any of the gutters along the roadside would usually be found the larvæ of these three species.

My specimens of *S. scutellaris* differ in some respects from the descriptions of the typical forms; the head has two white lateral bands; the white border of the eyes is very narrow or not apparent above; there are no lighter bands at the joints of the antennæ of the female; the white silvery line extends seven-eighths of the length of the mesonotum, much attenuated posteriorly; the white bands on the abdomen are represented only by white spots on the sides, but are very distinct below. It is probably close to var. *sumarensis*, Ludlow.

NOTES ON THE COCCINELLIDÆ.

BY THOS. L. CASEY, WASHINGTON, D. C.

In his recent essays on this family of beetles, Mr. Chas. W. Leng (Journ. N. Y. Ent. Soc.) has given results betraying some superficiality of study and lack of sound discriminative judgment. He seems to have pursued the eminently conservative course of assigning all species which are in any way remindful of others to rank as varieties of the latter, incidentally giving them three names, and frequently in a wholly arbitrary and whimsical manner. If he had examined these so-called varieties at all carefully, he would have been spared the responsibility for many needless errors.* The course followed by Mr. Leng and myself are at opposite taxonomic extremes. I tabulated virtually all the forms as species, because my material was not sufficient to warrant giving them a more definitive status, and not because I was not convinced that some of them might ultimately be proved to have less than specific weight. Mr. Leng, on the other hand, with material not so very greatly in excess of my own, has assumed to know that the true taxonomic position of practically every form which I defined is that of a variety or subspecies. He has apparently tried to imitate the European Catalogue in reducing most of the described forms of that region to varieties or aberrations, but if he were familar with them, he would see that many differ only by the absence of a spot here or a dash there, and that a large proportion of them are really synonyms. The latest European catalogue has, however, gone too far in its reductions from the specific status; the reverse swing of the pendulum is too radical, and there will be a gradually decreasing oscillation to a more rational intermediate position. I have endeavoured to define our various modifications broadly, on lines of general form, size, sculpture, structure or radical divergencies in the colour scheme, and feel certain that most of them are true species. The truth lies between the

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*If Mr. Leng had taken the very slight trouble to communicate with me regarding the status of *Exochomus subrotundus* and other points, a good deal of uncertainty could have been cleared up. I would gladly have aided him through special observations, or have given him cordial welcome to personal study of my collections, and this despite a baseless rumor which, I am reliably informed, is being circulated with more or less pertinacity by a Washington entomologist of some repute, to the effect that my collections are inaccessible—a statement smacking strongly of malice aforethought. I might add, however, that one who is actively favouring a departure from customary methods of doing anything whatever may have a few friends or passive onlookers, but a far greater number of irreconcilable doubters, with a modicum of more or less virulent enemies, so that he generally comes to draw the line of personal favour somewhere, even in matters scientific, as we are all human after all.

course pursued by me and that suggested by Mr. Leng, but, for the above reasons, I anticipate the ultimate decision will be far nearer the former than the latter.

It is probably true that the various forms defined in the genus *Megilla* have rather less than full specific value, but the Brownsville modification is so much larger that it may possibly prove to have very nearly specific weight. Another form, from Cuba, in my collection, has the two thoracic spots completely united, but I do not know how constantly.[*] Mr. Leng is, however, wrong in uniting *Macronœmia* with *Anisosticta;* it is a valid genus, and so recognized by Dr. Weise, who, however, arbitrarily changed the name to *Micronœmia*, a useless proceeding, as *Macronœmia* is amply protected by the laws of priority. *Paranœmia similis* is very readily distinguishable from the Californian *vittigera*, and is not a mere hypothetical race ; it is certainly, at least, a valid subspecies.

Hippodamia, Chev.

I assumed the authorship of Chevrolat for this genus, and not Mulsant, as this seems to be the course adopted by the latter himself in the Monograph (1866). Owing to the large number of recognizable forms and the variability of markings, unusually pronounced for the Coccinellidæ, where ornamentation is frequently so free from marked instability, there will probably always be more or less divergence of opinion regarding specific limitation. The *5-signata—convergens* group, much the largest of the genus in America, includes many species of indubitable reality, a far greater number, in fact, than the half-dozen recognized by Mr. Leng.

This *5-signata—convergens* series embraces two not very strongly-differentiated groups, one in which there is a transverse subbasal elytral fascia, sometimes more or less permanently disintegrated into spots or wholly wanting, and attended by a general absence or very great reduction or instability of the diverging discal lines of the pronotum, represented by the former, and the other in which the subbasal spots are either wanting or generally isolated, and accompanied by a very pronounced development and persistence of the diverging thoracic lines, represented by *convergens*.

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[*] *M. Cubensis*, n. subsp.—Smaller and rather less opaque than *fuscilabris*, red, the head black, with the usual acutely angulate frontal spot; pronotum solidly black, the apical and lateral margins alone pale, though broadly ; elytra with the usual spots of *fuscilabris*, except that the sutural post-medial is resolved into two spots, each tangent to the suture. Length, 5.0 mm.; width, 2.8 mm. Cuba (Havana).

The form which I described under the name *medialis* seems to be that figured by Gorham in the Biologia (VII, Pl. 8, fig. 20).

The *5-signata* group comprises by far the greater number of species. *Mæsta*, Lec., has a very uncertain taxonomic status but is evidently a member of the *5-signata* series; we have as yet no biological evidence concerning its relationships. *Ambigua*, Lec., of broadly oval form and constant absence of elytral maculation, is one of the most isolated species of the entire genus and without any close affinities. *Extensa*, Muls., though a member of this series, differs from the common forms of the *5-signata* or *LeContei* types in its very finely-reflexed elytral side margins, and it is undoubtedly a distinct species, probably having as a subspecies *leporina*, Muls. Mulsant (Mon., 1866) states of *leporina* that it is elongate-oval, slightly convex, with a black pronotum, having at each side a white border almost interrupted at the middle, the elytra with a subbasal band from callus to callus, and each with two black spots, the anterior somewhat in transverse triangle, the subapical smaller, obtriangular and united with the preceding; dimensions, 5.6 x 4.2 mm. California. So it cannot be considered in any way related to *vernix*, as stated by Leng. *Oregonensis*, Cr., is described as having a subbasal elytral band, with the posterior spots united to form a lunule, and the white thoracic side margin narrow; it is therefore probably a distinct species in this immediate neighbourhood, or, if not, may be a subspecies of *extensa*.

The species described by Kirby as *5-signata*, is essentially a boreal form, and may be known by the generally broad, solid and even bioblique subbasal band of the elytra, with a thick and obliquely transverse postmedian and full rounded subapical spot on each. The white lateral thoracic margin is confined to the apical angles; this oblique white area may sometimes be visible also at the basal angles, though I assume very rarely, and those examples with the pale area running down the sides, cited by Crotch, belong without much doubt to another species, mentioned below, and accidentally mingled with his true *5-signata*. The following is a more southern subspecies of *5-signata*:

H. coccinea, n. subsp.—More narrowly oval and smaller than *5-signata*, similarly moderately shining, closely and rather coarsely punctate; head black, with a large and irregularly rhomboidal pale spot; pronotum solidly black, without discal pale spots, the black area broadly bilobed in front, the lobes tangent to the apical margin, the sides obliquely pale in front, not at all pale posteriorly; elytra with a broad subbasal fascia, which is sometimes even, but often irregular, its arms less anteriorly oblique than in *5 signata*, sometimes with a small post-humeral spot also, the oblique post-median spot thinner and the subapical smaller, sometimes subobsolete; ground colour bright scarlet. Length, 5.4–5.6 mm.; width, 3.3–3.7 mm. Colorado (Eldora and Boulder Co.).

In *LeContei*, of which I have specimens from the type locality, New Mexico, the head always has a rhomboidal central pale spot as in *5-signata*, but the thoracic margins are broadly white at apex and base, though broadly subinterrupted at the middle by an abrupt spur from the central black area. There is less generally a subbasal fascia, and, when it occurs, it is more bilaterally attenuated. An allied form before me from Utah to Washington State, but probably specifically distinct and evidently a form frequently confounded with *LeContei*, may be distinguished readily by the broad entire white band on the head, from one eye to the other; this is constant in all my specimens. *Mulsanti*, of LeConte, from Lake Superior, the type locality, to Colorado, is a more northern form, with heavier subbasal marks, which frequently form a fascia, and this is no doubt the form frequently confounded with *5-signata*, as intimated above. The following might be regarded as another subspecies of *LeContei:*

H. abducens, n. subsp.—Much larger than *LeContei*, almost similarly marked, except that all black marks on the elytra before the middle are frequently obliterated; pronotum similar, except that the less angulate black area never completely divides the white margin, the diverging lines occasionally evident, but generally obsolete; surface slightly alutaceous, the punctures very fine; elytra before the two large posterior spots either devoid of all marking, even to the virtual obliteration of the sutural dash, or with a crescentiform fascia between the humeri, with but few intermediate stages of ornamentation, the post-humeral spot always completely obsolete; sixth ventral of the male without apical pit, even and entire. Length, 5.8–7.0 mm.; width, 3.7–4.3 mm. Colorado (Boulder Co.).

The general habitus of that form of *abducens* with obliterated antemedian marks, strongly recalls the eastern *glacialis*, but it may be distinguished readily by its narrower form and feebly developed or obsolete diverging thoracic lines, besides differences in sculpture.

Vernix is a much smaller and narrower form, specifically different from *LeContei* in having the very large rhomboidal frontal pale spot more or less narrowly extending to the sides of the head and enveloping the anterior parts of the eyes; *subsimilis* may be held to be a subspecies.

Another form in my cabinet, departing radically from *LeContei* in having the pronotal side margins narrowly and subequally pale from apex to base, may be described as follows :

H. Uteana, n. sp.—Smaller than *LeContei* and bright scarlet, with isolated large subhumeral spot and trilobed scutellar star, similar in general form, more shining, the punctures distinct and rather sparser ; head with rhomboidal isolated pale spot ; pronotum solidly black, without trace of discal spots, the lateral spur of the black area very obtuse, so that the unusually narrow lateral pale margin is subparallel, not much wider at any point than the entire apical pale margin, and never divided ; apex of the met-episternum pale, as well as the epimeron ; elytra with oblique post-median fascia and subapical circular spot. Length, 5.0–5.6 mm.: width, 3.25–3.4 mm. Utah (Sevier Lake, Marysvale and Nephi), Wickham.

Finally, we have a group of small species, in no way closely related to any others of the *5-signata* group. *Dispar* is recognized as sufficiently distinct to require no further notice. *Puncticollis* is an equally isolated species, readily identifiable by its small size, narrowly oval outline, narrow and uninterrupted pale thoracic side margin, complete absence of discal diverging lines, strong and close pronotal punctures and the peculiarly irregular post-median spot of the elytra. The following is a very distinct form related to *puncticollis* :

H. liliputana, n. sp.—Very small, narrow and parallel in form, the head with rhomboidal central spot as in *puncticollis*, but more slender, the pronotum much more sparsely punctate but otherwise nearly similar, except that there are two small basal impressions, at lateral fourth ; elytra pale brownish-yellow, the margins more finely reflexed than in *puncticollis*, the broad entire bioblique basal fascia similar, with its outer ends truncate, the spot just behind the middle large, rounded, with an external posteriorly oblique spur, the subapical spot large, transversely oval ; surface more shining, more coarsely and less closely punctate than in *puncticollis*. Length, 4.0 mm.; width, 2.2 mm. Colorado.

Most of the forms mentioned are, I think, true species; at least, there is no apparent reason for giving them less weight ; they have distinctive and readily observable characters, seem to breed true within more or less wide, though perfectly definite, limits of variation and satisfy all the usual definitions of species. It is too much to expect radical divergencies in colour pattern, for the general scheme of ornamentation in the Coccinellidæ is more of a generic than a specific character.

The species of the *convergens* group are fewer in number, those described thus far being *glacialis*, *convergens*, *15 maculata*, *obliqua*, *juncta* and *politissima*. In a very large series of *convergens* before me collected in many places from the Atlantic to the Pacific and as far south as Puebla, in Mexico, there is not a single example in which the slightest tendency to amalgamation of the post-scutellar spots to form a single star, or of the confluence of the post-median spots, either transversely or longitudinally, can be discovered. There may be such phenomena in nature, but I can only say that I have failed to observe them, and strongly suspect that those instances in which they have been announced, as in the unnamed form listed by Leng, refer to some other species, for it is only after much experience that the commingling of different species, so similar in their markings, can be avoided. The subbasal spots are sometimes obsolete, and occasionally all the spots, except the small scutellar dash, are wanting, but I have only observed this in a few Puebla specimens. The species described by Mulsant under the name *15-maculata* is much larger than *convergens*, and is abundantly isolated and perfectly valid, by no means a variety as surmised by Leng. I have a good series taken near St. Louis. *Juncta* is a very remarkable form, with a juxta-sutural vitta uniting the transversely confluent post-median spots with the subapical; it is apparently a species, but, if the future should decide otherwise, it will prove to be a subspecies of *obliqua* and not of *convergens*. *Obliqua* is a species quite distinct from *convergens;* it is smaller, still narrower and has several radical peculiarities of marking. As for *politissima*, it may for the present be disposed of as a subspecies of *obliqua*, of slightly shorter, stouter form, more obsolete punctuation and more polished surface. *Obsoleta*, proposed by Crotch as a variety of *convergens*, is to be completely suppressed as a manuscript name, for no description was given, the only statement made being "punctuation of elytra entirely obsolete," and this is erroneous, as no example of *Hippodamia* ever had the punctures entirely obsolete.

The *sinuata* section of the genus is composed of smaller and narrower species, on the whole, than those of the preceding, differing radically in the complete and constant absence of the two post-scutellar points, and in exhibiting a marked tendency to the longitudinal amalgamation of the discal spots to form vittæ from the humeral callus, there never being any tendency to posterior elongation of the subhumeral spot in the *5-signata*—*convergens* series. There are four known species, *spuria*, *Crotchi*, *sinuata* and *trivittata*. *Spuria*, Lec, is distinguished by the more gradually narrowed elytra behind the middle, or more elongate-oval form, as mentioned by LeConte. In the typical form, from Oregon and Washington State, the spot on the callus is always isolated and rounded, though the three posterior spots may be joined together to form a design resembling that of *parenthesis*, and the scutellar dash is always short, terminating abruptly near basal fourth, though frequently notably expanded at tip; *Americana*, of Crotch, is a subspecies occurring in New Mexico, having a greatly extended scutellar spot and the subhumeral and median spots frequently united, and, from Washington State and Utah, I have an intermediate form with scutellar spot extending about to the middle or a little beyond. In *Crotchi* the body is more oblong, the elytra more rapidly narrowed and rounded apically, and, in typical forms, the subhumeral spot is always joined to the medial by a subparallel black vitta; the scutellar spot attains basal third and is always more or less broadly rhomboidal, the conformation being as in the subspecies *complex*, of *spuria*. The side margins of the elytra are extremely finely reflexed, and not with a distinct gutter as in *spuria* and its variations. In *sinuata* there is a discal vitta on each elytron, which is almost semicircularly curved apically, and in *trivittata*, which is a much smaller species, the vitta is almost straight throughout, becoming but feebly oblique apically. *Falcigera*, of Crotch, because of the black met-episterna and lack of discal thoracic spots, always so well developed in *sinuata* and allied species, must be considered as a section by itself. I am disposed to hold that the coarse-print paragraph under *Americana*, in Crotch's paper, was really misplaced by the printer in making up the page, and should have followed the preceding *falcigera*, because the met-epimera in *Americana* are undoubtedly pale, as in the other species.

Finally, in regard to the *parenthesis* section, there can be little or no reasonable doubt that *parenthesis* and *apicalis* are distinct species. In the former there is never any tendency in the circular spot on the callus to prolong itself posteriorly, and the subapical spot never attains the sutural angle, while in the latter there is a marked tendency in the subhumeral spot to posterior elongation, and the subapical always attains the sutural angle. I have never seen an exception to these laws in large series, even where the eastern and western species come together on common territory in Colorado, and have never seen anything that appeared to be a hybrid, although hybrids between distinct species frequently do occur, so that this would not be conclusive evidence. As for the exceptional form figured by Leng, having the humeral spot connected with the post-median, the latter not attaining the sutural angle, I can only say that if the short, broad form of the body and the peculiar form of the anterior margin of the prothorax are truly drawn, it is entitled to a distinctive name, either as a species or a very peculiar subspecies of *parenthesis*. The following is also an interesting subspecies of *parenthesis* :

H. expurgata, n. subsp.—Shorter, rather smaller and relatively broader than *parenthesis*, highly polished, with distinct moderate punctures, pale brownish-flavate ; prothorax shorter and more transverse, nearly similar in maculation ; elytra with a scutellar dash, rapidly expanded at its tip and a rounded subhumeral spot, the remainder of the elytra without spots or with a small post-median spot, and sometimes a still smaller subapical one. Length, 4.0 mm.; width, 2.6 mm. Colorado (Boulder Co.).

Mr. Leng has also figured this form having a small posterior dot.

This *parenthesis* group has a distinct suggestion of the two post-scutellar points of the *5-signata* group, combined with the vitta-forming tendency of the *sinuata* group and a system of pronotal maculation peculiar to itself.

List of American Hippodamia.

A

1. 13-punctata, Linn. — Holarctic
tibialis, Say.

B

*

2. mœsta, Lec.—Pac. coast.
3. ambigua, Lec.—Calif.
punctulata, Lec.
4. extensa, Muls.—Calif.
ssp. leporina, Muls.—Calif.
5. oregonensis, Cr.—Oregon.
6. 5-signata, Kirby.—B. Am.
ssp. coccinea, Csy.—Col.
7. Uteana, Csy.—Utah.
8. LeContei, Muls.—New Mex.
ssp. Mulsanti, Lec.—L. Sup. to Col.
ssp. abducens, Csy.—Col.
9. vernix, Csy.—Wy.
ssp. subsimilis, Csy.—Col.
10. puncticollis, Csy.—Can. R. Mts.
11. liliputana, Csy.—Col.
12. dispar, Csy.—Col.

**

13. glacialis. Fabr.—East. N. Am.
14. convergens, Guer.—Atl., Pac. and Mex.
obsoleta. Lec., i. litt.
15. obliqua, Csy.—Calif.
ssp. politissima, Csy.—Cal.
16. juncta, Csy.—Calif.
17. 15-maculata, Muls.—Ill., Mo.

C

18. spuria, Lec.—Or., Wash., Ut.
ssp. Americana, Cr.—N. Mex.
ssp. complex, Csy.—Wash., B. Col.
19. Crotchi, Csy.—Calif.
20. sinuata, Muls.—Calif.
interrogans, Muls.
21. trivittata, Csy.—Calif.

D

22. falcigera, Cr.—B. Am.

E

23. parenthesis, Say.—Atl. to Col., Wy., Wash.
tridens, Kirby.
lunatomaculata, Mots.
ssp. expurgata, Csy.—Col.
24. apicalis, Csy.—Col. to Calif.

Adalia, Muls.

In my opinion *ophthalmica*, *ovipennis*, *annectans* and *transversalis* are valid species; *ornatella* might be regarded as a subspecies of *transversalis*, but no other close alliance can be discerned. The coarse and very conspicuous punctures of the latter, as well as *ornatella*, distinguish them at once from *annectans*, without noting peculiarites of ornamentation. I do not think that we have the true *Arctica*. The following is an interesting addition:

A. coloradensis, n. sp.—Form rather more narrowly oval than in *annectans*, convex, highly polished, finely and moderately punctate, pale brownish-red; head black, with a pale spot next each eye; pronotum solidly black, without trace of median basal pale spots, the very fine apical pale margin sometimes obliterated, the sides broadly pale, without black spot, being like those of *bipunctata*, except that the oblique sides of the black area are irregular, having a feeble oblique sinus at the middle; elytra wholly pale, excepting a feebly oblique transverse spot at middle, half as far from suture as side margin, and a transversely duplex sub-apical spot on each. Length, 3.9–4.6 mm.; width, 2.75–3.3 mm. Colorado (Boulder Co.).

Represented by three specimens holding together very well; in one of them there is an obtuse lateral spur from the black pronotal area just behind the middle, but it is of a piceous colour, adventitious and not properly homologous with the spur in *annectans* and allied forms.

Coccinella, Linn.

In this genus Mr. Leng has succeeded in augmenting the confusion and uncertainty, rather than contributing anything to the sum of human knowledge. A very cursory comparison, especially as to thoracic ornamentation, of the American examples referred by Crotch to *trifasciata* and typical native examples of the latter, would have shown him that specific identity is out of the question, and that the name *perplexa*, Muls., that I employed, and which he so unceremoniously rejects, is the only proper one to give the American species. Furthermore, there was no need to go back to the formerly assumed equality of *transversoguttata* and *5-notata*. A Siberian example of the former before me shows that the latter is a different species, larger, more convex and more elongate-oval, as well as somewhat differently marked, and *suturalis*, which he transforms into a variety, though sufficiently remarkable to bear the burden of italics, is in no way closely related to any other species, being one of the most depressed and compact species known at present and evidently valid.

The genus as restricted in my Revision may be divided into two primary sections, the first having the black thoracic area extending broadly to the anterior edge, the second having the black area separated therefrom by a more or less broad complete pale border. The first section comprises most of the large species with tendency to transverse fasciation of the elytral markings. The second is divisible into three minor groups, represented by *9-notata*, *perplexa* and *tricuspis*. In the first section there are several primary type forms, represented by *5-notata*, *monticola* and *Californica* respectively. To the *5-notata* group belong in addition only *nugatoria*, *Johnsoni* and *Sonorica*. The *monticola* group includes as species *monticola*, with *impressa*, differing in sculpture but probably a subspecies, the distinctly isolated *suturalis*, *alutacea*, much larger, more convex and with a much more pronounced posterior prolongation of the lateral thoracic white area, *prolongata*, with very irregular white lateral area, which, by a transverse spur, tends to form a partial apical white margin bordering the black area, and *difficilis*.

The *Californica* group includes besides only *Nevadica*, agreeing in the total absence of discal spots on the elytra but differing in its more broadly oval form, pale and not blackish sutural edges, and, more particularly, in its much coarser, denser and more conspicuous punctuation.

The first group of the second section includes *9-notata*, *degener* and *Oregona*, the last two of which may be regarded as subspecies. The second group is composed of *perplexa*, *subversa*, with subspecies *Juliana*, of which *barda* is a synonym, and *Eugenii*, the latter a valid species. The third group consists of the remarkably isolated *tricuspis* alone.

The following are the new species or subspecies mentioned above :

C. *Sonorica*, n. sp.—Large, broadly oval, very convex, rather shining, finely and inconspicuously punctate ; head with the usual juxta-ocular spots ; pronotum with a moderate quadrate spot at each angle, extending posteriorly only to the middle, the black, however, ascending along the edge almost to the angle, the entire hypomera black except at tip ; elytra with a large transversely biangular scutellar spot, a thick transverse spot on each at the middle, from inner fourth to outer third, without trace of additional external spot, and a subapical similar spot from inner third to outer sixth. Length, 6.2–7.0 mm.; width, 4.8–5.4 mm. Mexico (Colonia Garcia, Chihuahua), Townsend.

C. Johnsoni, n. sp.—Not very broadly oval, very convex, polished, extremely minutely punctulate; head with the usual two large pale spots; pronotum with a quadrate spot at the angles, with the lateral border black for some distance anteriorly, the hypomera pale only at apex, the pale area extending posteriorly near the edge to apical two-fifths; elytra with the sutural edges finely blackish, a moderate rhomboidal scutellar spot, and each with a circular subhumeral, a medial from inner fourth to the median line, a very small submarginal at a third from the base and two subapical spots, the outer of which is much the smaller but detached. Length, 6.0 mm.; width, 4.7 mm. California (San Diego).

This form, which I originally considered a spotted modification of *Californica*, but which in reality is a very well-marked species of the *5-notata* series, is dedicated with pleasure to Mr. Roswell H. Johnson. who is now engaged upon a general biological study of colour variations in the Coccinellidæ.

C. Oregona, n. subsp.—Large in size, distinctly elongate-oval, yellowish, polished, finely punctate; head pale, the apical and basal margins evenly, transversely black; pronotum with a large quadrate anterior spot at each side, the two united along the apical margin, the hypomera pale in apical three-fifths; elytra with the sutural edges finely blackish, a small subrhombiform scutellar dash, and each with the usual spots of *9-notata*, though much reduced in size, especially the subhumeral, which is almost obsolete. Length, 6.4 mm.; width, 4.9 mm. Oregon (southern).

I have a good series of *difficilis* from Utah, collected by Wickham, and its broadly rounded, subhemispherical form and markings evidently ally it to the *monticola* group, in the vicinity of *alutacea*, and not, as indicated by Crotch, to *perplexa* (= *trifasciata*, Cr., nec L.). I have also received the true *nugatoria*, from Santiago, Mexico, since my last revision of the genus, and find that the subhumeral spot is well formed and circular, the post-humeral also distinct and the scutellar blotch transversely oval, indicating that it does not coalesce with the subhumeral, and the elytral punctures are so nearly obsolete that they are only to be discerned with difficulty. In *5-notata* the subbasal fascia is seldom resolved into three spots, and then in such ragged fashion as to show at once that they have been derived by disintegration. and the elytral punctures are very distinct. I think, therefore, that *nugatoria* ought to have the status of a species.

List of Coccinella.

A

*

1. 5-notata, Kirby.—Mont., Ut., N. Mex.
2. nugatoria, Muls.—Mex.
    transversalis, || Muls.
3. Johnsoni, Csy.—Calif.
4. Sonorica, Csy.—Mex.
5. monticola, Muls.—L. Sup. to Vanc.
    lacustris, Lec.
    ssp. impressa, Csy.—Calif.
6. suturalis, Csy., Calif.
7. alutacea, Csy.—Col., N. Mex.
8. difficilis, Cr.—Utah.
9. prolongata, Cr.—Col., Ut.
    monticola, Lec., nec Muls.

**

10. Californica, Mann.—Calif.
    franciscana, Muls.
11. Nevadica, Csy.—Nev.

B

*

12. 9-notata, Hbst.—Atl. to Col.
    ssp. degener, Csy.—Col., N. M., Ariz.
    ssp. Oregona, Csy.—Oregon.

**

13. perplexa, Muls.—R. I., Mich., Wis.
    trifasciata, Cr., nec L.
14. subversa, Lec.—Oreg.
    ssp. Juliana, Muls.—Calif.
    barda, Lec.
15. Eugenii, Muls.—Calif.

***

16. tricuspis, Kirby.—Br. Am., L. Sup.

An examination of the Mexican species placed by Gorham in *Coccinella*, shows too great diversity for a single genus, and in fact the true *Coccinella*, as represented by the type, *7-punctata*, Linn., does not seem to be at all well represented in Mexico. For such species as *luteipennis*, *ampla*, *cyathigera* and *albopicta*, I would propose the generic name *Harmoniaspis* (n. gen.), and for *compta*, *concinna* and *pantherina*, with much shorter antennæ, the name *Harmoniella* (n. gen.). In imposing the name *Harmonia*, the type of which may be assumed to be the Brazilian *Sommieri*, upon such an inharmonious assemblage of species, it is assumable that Mulsant merely desired to indulge to a slight extent in entomological "plaisanterie." The name has since been used three or four times in other classes and orders of animals.

Cycloneda, Cr.

The species named "*ater*" in my Revision was first placed in *Exochomus*, where the name was given it, but afterwards transferred to *Cycloneda*, the name being inadvertently printed as at first applied. It is to be hoped that this explanation will be acceptable to Dr. Weise, who kindly pointed out the error. The name of the species should be *atra*, and not "*ater*." It is a very peculiar species, only doubtfully a member of *Cycloneda*, but may remain there for the present. Although rejected by Leng, because of doubt concerning its geographic habitat, there can be but little question that it belongs to the fauna of this country, as there was but little or no foreign material in the Levette cabinet, whence it came. The error in the name "*ater*," just referred to, which, by the way, was not discovered by Mr. Leng, reminds me of a still more flagrant lapsus on p. 141 of my Revision, where I have imposed a name "*postpinctus*" upon a harmless Scymnid ; it should of course be *postpictus*. And this leads me to notice a new high Latin rendition of the word fourteen, which Mr. Leng (Jr. N. Y. Ent. Soc , 1903, p. 206) informs us should be "*quatrodecim*," in striving to write the name *quatuordecimguttata*.

The true *Cycloneda* has as its type *sanguinea*, Linn. Such forms as *Gilardini*, Muls., from Colombia and Central America, form a distinct genus which may take the name *Spiloneda* (n. gen.).

Olla, Csy.

In Mexico there are several species of *Olla* still unnamed ; one of these, from Vera Cruz, differing very radically from *abdominalis*, was outlined as a variety of the latter by Mr. Gorham (Biol. VII, p. 172, pl. 9, fig. 24). It differs in having two large elongate-oval subbasal and two large divaricately oblique elongate-oval median spots on each elytron. It may take the name *Olla Gorhami* (n. sp.). Besides *V-nigrum* and *Salléi*, the genus may also include, among the Mexican species, such forms as *Coccinella maculosa* and *quichensis*, although it is impossible to definitely decide this without actual observation.

The name *oculata*, Fabr., for the black forms in this genus, is, I think, clearly untenable. The statement that there is a rounded pale spot at each side of the pronotum in *oculata*, would seem to set the matter at rest, and the Fabrician *oculata* must apply to some species in another genus, probably *Cœlophora*, with the assumption that the locality given by Fabricius for *oculata* is erroneous ; this is a much more legitimate conclusion than to assume the description to be erroneous, as suggested by Leng. The slender irregular pale area along the sides of the pronotum in these black forms of *Olla* could never, by any stretch of the imagination, be considered rounded, whereas the rounded form is very common in *Cœlophora*. It may be said, also, that casual observation of the series of these black forms in my collection must convince any systematist that there are a number of distinct species, differing conspicuously in form and size of the body, as well as in the form and, to some extent, the position of the elytral pale spots. This would seem to militate against considering them a melanic modification of *abdominalis;* but this question appears to be no nearer a solution now than in former times. It would be one of the most interesting problems for the experimental biologists to solve. The following is allied to *abdominalis:*

O. minuta, n. sp.—Form as in *abdominalis*, almost impunctate; head pale, with a biangulate basal black area; pronotum with broad lateral and apical pale margins, the black area almost solid, having merely two very small, nubilous and elongate discal points; it is broadly bilobed anteriorly, and has at each side a post-median spur; elytra with the scutellum and sutural edges finely blackish, each with four subbasal spots as in *abdominalis*, though relatively larger, and three much larger median spots, the outer two elongate, extending to apical fourth, the subapical large, only narrowly isolated. Length, 3.2 mm.; width, 2.7 mm. Texas (Brownsville), Wickham.

Differs in its very much smaller size, still more highly polished surface and development of the markings, which are, however, of the same order as in *abdominalis.*

Pseudocleis, n. gen.

An examination of the figure of *Cleis lynx*, given by Gorham in the Biologia, indicates that our *Harmonia picta* cannot be associated with it, and should have a distinctive generic name. I would propose the name *Pseudocleis*, with *picta* as the type.

The species described by me as *Hudsonica* is perfectly valid, and not a variety of *picta*, as stated by Leng; *minor* is, however, properly a subspecies, and there are two other forms in my cabinet that might with some propriety receive varietal designations. It is almost superfluous to add, to anyone who has actually made careful comparative observations, that our *Anisocalvia cardisce* and *Victoriana* can in no wise be considered as closely allied to the European *14-guttata.* It may be barely possible that we have been misinterpreting the *12-maculata* of Gebler; at any rate, I am unable to verify the name by plain count of the spots; there are eleven on the elytra and two on the pronotum.

Anatis, Muls.

The species which I described under the name *LeContei* is so distinct from *Rathvoni*, Lec., in every feature, that it could under no circumstances be confounded with it, except by pure perversity. This error on the part of Mr. Leng, which is the most unaccountable that I can recall having seen in print, and, I understand, not typographic, as I had at first supposed, naturally engenders a suspicion that this author must needs have a very inconstant and peculiar personal equation in regard to reliability.

Neomysia, Csy.

Although the American and European species are probably congeneric, our European colleagues do not seem to have discovered that the name *Mysia* was long since preoccupied when imposed by Mulsant. The name *Neomysia* has therefore to be used for the species of both continents. Crotch, who had probably seen the type, states that *subvittata*, Muls., has the elytra broadly dilated at the sides, which makes it very doubtfully a species of *Neomysia*, where it is placed by Leng, but more probably an *Anatis*, to which genus it is assigned by Crotch. The synonymy proposed by Mr. Leng is therefore erroneous. The assignment of *interrupta* to *Horni* as a variety is, moreover, an error almost as flagrant as that noticed above under *Anatis LeContei*; the two are evidently distinct species, *Horni* being the smaller and much less broadly rounded, irrespective of differences in ornamentation.

Psyllobora, Chev.

Of the described forms in this genus, *20-maculata*, *renifer*, *borealis*, *tædata*, *deficiens* and *nana* are true and valid species; *obsoleta* may be considered a synonym of *20-maculata* and *parvinotata* as a subspecies; *separata* may be regarded as a subspecies of *tædata*.

Tribe EXOPLECTRINI.

This tribe, including such genera as *Rodolia*, *Vedalia*, *Novius* and *Exoplectra*, with rounded form, pubescent surface and wide, externally descending epipleura, should be interpolated in the table of tribes given in my Revision immediately after Epilachnini.

The genus *Neaporia*, of Gorham, is certainly composite and, as no type was named, I would propose *metallica*, Gorh., as the type. *Plagioderina*, Gorh., evidently forms another genus, much more broadly orbicular, for which the name *Aneaporia* (n. gen.) may be suggested. *Indagator*, together possibly with *compta*, probably forms another genus. Some important generic characters doubtless exist in antennal and sternal structure, to which Mr. Gorham makes little or no reference.

Anovia, n. gen.

Body rounded or broadly suboval, convex, evenly punctate and pubescent, the epipleura very vaguely and scarcely visibly impressed for the femora; prothorax distinctly narrower than the elytra, finely margined at base and truncate at the scutellum, broadly and deeply emarginate at apex; head with the eyes entire, only partially concealed by the prothorax, the epistoma and labrum broadly and very feebly sinuate; antennæ short and thick, 8-jointed, the club fusoid, with the joints compactly joined; maxillary palpi thick, the last joint strongly securiform; prosternum between the coxæ narrow, tumescent, rapidly sloping behind, the mesosternum with a transverse tumescent ridge at apex; abdominal plates very short, entire; anterior tibiæ flattened, their external edge longitudinally impressed for the reflexed tarsi; claws with a laminate internal tooth at base.

The type of this genus, which differs from *Novius* in its broadly and deeply sinuate apex of the prothorax, is the following:

A. virginalis, Wickh.—A cotype of this species from Chadbourne's Ranch, Utah, was kindly given me by Prof. Wickham. It was described under the name *Scymnus virginalis*, but the author recognized its generic incompatibility. The specimens from St. George, Utah, seem to be smaller, less suffusedly coloured and with rather straighter parallel sides of the prothorax, but they have the sixth abdominal segment, as in the cotype, well developed, and almost as long as the fifth; this sixth segment does not appear to differ much in the two sexes. I also have another specimen, differing but slightly, from El Paso, Texas.

Chilocorus, Leach.

In this genus the species *orbus*, Csy., is not a variety of *bivulnerus*, nor *confusor* a variety of *cacti*, as stated recently by Leng (l. c., 1908, p. 37, 38), but in each case specifically distinct. *Fraternus*, of LeConte, is at least a well differentiated subspecies of *bivulnerus*, recognizable by its smaller size and much less dilated form, as can be observed with greatest ease in large series. *Cacti*, Linn., is a very much larger and more broadly rounded species than *confusor*, as clearly shown by some specimens in my cabinet from Puebla, Mexico, and Honduras; the latter occupies the arid regions from San Diego to Nogales. I have recently seen a specimen of *fraternus* taken at Nogales, Ariz, which is probably near its extreme southern limit of distribution: besides being smaller and narrower than *bivulnerus*, the punctuation is much finer and feebler.

I have recently received a typical example of *Axion plagiatum* from Puebla, Mex., and am in position to prove that *Texanum*, Lec., is a distinct species, differing, among other characters, in that in *cacti* the two elytral spots are separated across the dorsal surface by only about half the distance that separates them in *Texanum*, due allowance being made for sexual differences. *Alutaceum* is smaller, narrower and more compressed than *Texanum*, and is probably specifically different; *pleurale* is also in all probability a distinct species and not a variety, as stated by Leng; at any rate, it would be a subspecies of the true *plagiatum* and not of *Texanum*.

Exochomus, Redt.

Brumus, "Weise" (Leng).

Mr. Leng divides this genus into three named subgenera, of which the first, *Arawana*, founded upon *Arizonicus*, is probably a distinct genus and not a subgenus, as it differs in important structural characters as well as in the entire scheme of coloration, which is almost as important. As to *Brumus*, "Weise," I am uncertain whether he means *Brumus*, Muls., or not. In his *Brumus* there apparently should be no acutely angulate quadrate ungual tooth, as in typical *Exochomus*, but there is always either a pronounced basal swelling or bulbosity, as in *parvicollis*, or a rapid thickening of the claw as in *Hogei*, or an almost completely simple form as in *septentrionis*, with the strong probability, when we consider the absolutely similar or correlative scheme of ornamentation and the identical facies, that there are intermediate forms. I therefore still hold that there is but a single genus, and that *Brumus*, "Weise" (Leng) would be a complete synonym of *Exochomus*, if there were no other distinction than that of the dentition of the tarsal claws. The case is parallel to that of *Oxynychus*, Lec., and *Hyperaspis*. But to show how very uncertain the boundaries of *Exochomus* and *Brumus*, Weise, become, when based solely on dentition, it may be stated that in *æthiops*, Bland, the tooth is perfectly distinct and sharply angulate, as usual in *Exochomus*, though rather less elevated, but this species is placed by Weise and more reluctantly by Leng in *Brumus* and not in *Exochomus*. *Subrotundus* has tarsal claws nearly as in *marginipennis*, but with the apical part less abruptly deflexed and, as the ornamentation in *Exochomus* is not highly variable, as assumed, but on the contrary noticeably constant and persistent, I have no doubt that *subrotundus* is a valid species, and this is confirmed by its very small size and almost circular form. To compare it with *fasciatus*, with its much more elongate-oval form and different colour scheme, as suggested by Leng, is a decided mistake. The tarsal claw of *fasciatus* is wrongly outlined on the plate by Mr. Leng, the basal tooth being large and subparallel as in *marginipennis*, though less elevated.

The tarsal claws in *deflectens*, *latiusculus* and *marginipennis*, very thick at base, with the apical part very slender and abruptly bent downward, are, however, noticeably different from the form assumed in the *æthiops*, *septentrionis* and *desertorum* group. Perhaps it may be this quite perceptible difference in the shape of the claw that constitutes the true difference between *Exochomus* and *Brumus*, and not the mere presence or absence of a basal tooth ; if this be the case the *Brumus* of Leng might possibly be considered a valid subgenus, although there are probably intermediates, and I would prefer to consider our species at least as constituting a single genus. The European *Brumus*, Muls., may, however, be different.*

Septentrionis, Weise, is the northern and eastern species, of unusually large size, called *Davisi* by Mr. Leng, and it is not at all the *Högei* of Gorham, the latter being a far southern and essentially Sonoran form, very distinct in appearance and constant in ornamentation. *Desertorum* and *ovoideus* seem to have given rise to much unnecessary confusion on the part of Mr. Leng, for he puts one in the section with dentate claws and the other in his *Brumus*, Weise. They both belong to the latter section, and are mutually allied, though I am now convinced distinct species or subspecies. *Desertorum* is of very broadly oval outline, and generally has a long anterior wisp-like prolongation from the posterior spot, while *ovoïdeus* is very narrowly and more evenly elliptic, with the humeri scarcely at all exposed at base and has the posterior spot circular and clearly limited throughout its circumference, without suggestion of prolongation. Neither of these forms has anything whatever to do with *Californicus*, either in general appearance or other token of consanguinity.

The following species or subspecies may be made known at this opportunity :

E. deflectens, n. subsp.—Broadly oval, strongly convex, alutaceous and black, the anterior angles of the pronotum nubilously pale; elytra pale

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*The genus *Brumus*, Muls., as represented by its type, *8-signata*, which I have examined since the above was written, differs rather radically from this American *Brumus*, "Weise" (Leng), in having an entire basal margin of the pronotum, very large post-coxal arcs, much longer tarsal claws, and in its entire scheme of ornamentation. If, therefore, our species form a genus or subgenus distinct from *Exochomus*, it is still unnamed.

reddish, each with two very large subequal isolated black spots, one just before, the other well behind, the middle, the punctures fine, sparse and inconspicuous ; legs pale, the femora piceous ; claws as in *marginipennis*. Length, 3.0 mm.; width, 2.6 mm. Missouri.

Allied to *marginipennis*, but of broader outline, finer punctuation and with the anterior and posterior black areas of each elytron subequal in size and wholly isolated. It resembles *latiusculus* in form more closely, and may, for the present, be considered a subspecies of the latter, which is specifically different from *marginipennis* in its much more broadly rounded outline.

E. Mormonicus, n. sp.—Very broadly rounded, strongly convex, highly polished, virtually completely impunctate, deep black throughout ; tarsal claws well developed, moderately and almost evenly arcuate, with a distinctly defined rectangular basal tooth within. Length, 3.2–4.0 mm.; width, 2.8–3.5 mm. Utah (Marysvale), Wickham.

E. Townsendi, n. sp.—Smaller, much more elongate-oval in form, very convex, polished, deep black throughout, virtually impunctate, the elytra vertically declivous to the lateral bead, which is finer than in *Mormonicus* and *æthiops*, in which species also the elytra become evidently subexplanate along the sides, especially anteriorly ; claws nearly similar, with an even more distinct acute rectangular tooth. Length, 2.8–3.0 mm.; width, 2.2 mm. Mexico (Colonia Garcia, Chihuahua), Townsend.

Mormonicus is larger, very much more nearly circular and more polished than *æthiops*, Bland, and has the elytra practically impunctate even near the thick lateral bead, where numerous distinct punctures are observable in the latter ; the prothorax is also larger and more especially of a different shape, being more elongate along the median line. Besides differing as stated in the description, *Townsendi* is of more narrowly oval form than the feebly alutaceous *æthiops*, and has the front distinctly more advanced before the line of the eyes. Both of these forms are species distinct from *æthiops*.

E. parvicollis, n. sp.—Very broadly rounded, convex, polished, virtually impunctate, black, the anterior thoracic angles not paler ; elytra black, with a broad parallel lateral rufous area from the humeri, obliquely narrowed just before the middle, and extending thence narrowly and more nubilously for a short distance further, also extending along the basal margin, and sometimes with a slight posterior angulation, almost to the scutellum ; also with a subangulate subapical discal pale spot ; under surface irregularly rufescent, the legs black ; tarsal claws long, evenly arcuate, with a distinct though rounded swelling internally at base. Length, 2.4–3.0 mm.; width, 2.0–2.7 mm. Utah (St. George), Wickham.

Resembles *desertorum*, but differs in its much shorter and more broadly rounded form and relatively much narrower prothorax. Four homogeneous specimens.

In *septentrionis*, Ws. (= *Davisi*, Leng), the size is large, the form elongate-oval and the punctures rather coarse, deep and very conspicuous ; there is only a distant relationship between this and *desertorum* and *ovoideus*, and the latter are properly true species and not varieties, at any rate as far as *septentrionis* is concerned ; in them the maxillary palpi have the fourth joint much shorter and more securiform than in *septentrionis* among other differences.

List of Exochomus.

A

Exochomus in sp.

1. marginipennis, LeC.—S. Atl.
   prætextatus, Muls.
2. fasciatus, Csy.—S. Calif.
3. latiusculus, Csy.—S. Tex.
   ssp. deflectens, Csy.—Mo.
4. Childreni, Muls.—Tex., Mex.
   Guexi, Lec.
5. Californicus, Csy.—N. Calif.
6. subrotundus, Csy.—El Paso.

B

Brumus, "Weise" (Leng).

7. æthiops, Bland.—N. Mex , Col.
8. Mormonicus, Csy.—Utah, Nev.
9. Townsendi, Csy.—Mex.
10. parvicollis, Csy.—Utah.
11. histrio, Fall.—S. Calif.
12. desertorum, Csy.—Nev.
    ssp.? ovoideus, Csy.—Nev.?
13. orbiculatus, Leng.—Ariz.
14. septentrionis, Ws.—N.-East N. Am.
    Davisi, Leng.
15. Högei, Gorh.—Mex., N. Mex.
    ssp. Nevadensis, Leng.—Nev.

Brachyacantha, Chev.

The following species is allied to *ursina :*

B. Uteella, n. sp.—Form elongate-oval, very convex, polished, minutely, rather sparsely punctate, black ; female with yellow spots as in *ursina*, and nearly as large, except that the two medial are relatively more distant from the two basal, so that, instead of forming a square as in *ursina*, they form a slightly elongate rectangle ; pale side margin of the prothorax much less broadly dilated anteriorly. Length, 3.6 mm.; width, 2.3 mm. Utah (Milford), Wickham.

A subspecies of *Uteella* may be defined as follows :

B. Sonorana, n. subsp.—Form still narrower than in *Uteella*, ellipsoidal, polished, black, very minutely, decidedly sparsely punctulate ; female with spots nearly as in *Uteella* but much smaller, except that the rectangle formed by the basal and slightly post-medial spots is still more elongated and the humeral spot is reduced to a small dot; the basal spots differ in being very small, nubilous and wholly detached from the margin. Length, 3.0 mm.; width, 2.0 mm. Mexico (Colonia Garcia, Chihuahua), Townsend.

I have not examined the male in either of these forms, which differ profoundly from *ursina* in their narrower, more elongate outline, and, more especially, in the very fine and sparser punctures.

B. metator, n. sp.—Form and coloration nearly as in *testudo*, deep black, polished, the spots sharply defined, rather small and bright yellow ; head (♀) black throughout, the pronotum black, with the yellow lateral margin moderate, dilated somewhat anteriorly ; elytra distinctly though moderately punctate, the spots nearly as in *testudo* but smaller and more widely separated, the basal not basally truncate, but circular and only tangent to the basal margin ; legs pale, the femora gradually piceous toward base. Length, 2.2 mm.; width, 1.7 mm. Texas (Del Rio), Wickham.

Differs from *testudo* and *Bolli* in having the head of the female black and not pale, and in the form of the basal spots of the elytra.

Hyperaspis, Chev.

In this genus the variety which I described under the name *angustata* should be considered a synonym of *elliptica*. On the other hand, the variety that I described under the name *omissa* would appear to have greater value, perhaps fully specific, as the form is rather more oblong and less convex, the punctures more crowded toward the sides of the pronotum, and the total absence of the conspicuous and very constant discal spot of *lateralis* gives it a very different appearance. *Notatula* should be removed from its position as originally published to the vicinity of *4-oculata*. The following species have come to light since my last revision :

H. æmulator, n. sp.—Broadly oval, very convex, black, shining, rather finely and loosely punctate ; head (♀) piceous, very gradually darker basally ; pronotum with a large internally rounded yellow spot, wider than long, at each side ; elytra each with three moderately large subequal yellow spots, one somewhat obliquely subquadrangular at two-fifths and inner third, another rather smaller, rounded and marginal, just visibly less basal and truncated by the margin, and another, somewhat transversely oval, near the apical margin, and much more distant from the suture; beneath black, the abdomen pale marginally, the legs pale. Length, 2.6 mm.; width, 2.0 mm. Arizona (Nogales), Nunenmacher.

To be classed with *medialis*, but not closely related, much larger, with slightly more anterior discal spot and piceous head in the female. The head is pale in both sexes of *medialis*.

H. fastidiosa, n. sp.—Broadly suboblong-oval, convex, black, polished, finely though rather strongly and closely punctate; head (♂) dark rufo-piceous, gradually becoming blackish basally and yellowish apically; pronotum with a large yellow spot, internally angulate and wider than long, at each side; elytra each with three large yellow spots, one elongate-oval, from basal seventh to the middle and inner sixth to just beyond the middle; another, marginal, from the humeri to apical third, acuminate anteriorly, and gradually though moderately dilated posteriorly, the third large, subobtriangular, very close to the apical margin, and but little further from the suture; beneath black, the abdomen nubilously pale marginally, the legs pale. Length, 2.2 mm.; width, 1.65 mm. California (San Diego), Nunenmacher.

H. conspirans, n. sp.—Smaller, less broadly and more evenly oval, convex, polished, black, finely, less closely punctate; head (♂) bright yellowish-white, abruptly black only at the base of the occiput; pronotum with a large internally arcuate yellow spot, as wide as long, at each side; elytra each with three rather large similarly straw-yellow spots, one rounded, from basal fourth to the middle and inner fifth to a little beyond the median line; another, marginal, semicircular, at the middle and the third somewhat smaller, slightly irregular, subtransversely oval, distinctly separated from the apical margin, and subequally so from the suture; under surface black throughout, the legs black, the anterior pale. Length, 1.6 mm.; width, 1.1 mm. Arizona (Nogales), Nunenmacher.

Both of the above species are allied to *gemma*, the first differing in its very differently coloured head in the male, and total absence of the conspicuous yellow apical thoracic margin of *gemma*. The second has the same pale yellow head in the male, but lacks the pale apical thoracic margin or any indication that it could exist, as the lateral spots are rounded internally, their arcuate margin becoming more externally oblique anteriorly to the apical angles; a very similar species, of which I only have females at present, occurs at Alpine, Texas.

Mr. Chas. Schaeffer (Sci. Bull., Br. Inst., Vol. 1, p. 145) confuses *medialis*, and inferentially also *gemma*, *fastidiosa* and *conspirans*, with *sexverrucata*, Fabr., and *pratensis*, Lec., must be closely related. But Mr. Schaeffer is mistaken in this, as a little closer observation would have shown him that there are a number of distinct species, and, on consulting Mulsant's description of *sexverrucata* (Spec., p. 639), which is a South American insect, he would have read the following diagnosis: Briefly and obtusely oval; prothorax brown or red-brown, ornamented each side with a yellow border; elytra black or brown, each with three yellow spots, two suborbicular near two-fifths of the length, the external bound to the lateral border, the third subapical, obtriangular. The coloration of the pronotum prohibits any close alliance with these Sonoran forms, and Gorham was hasty in assigning those from northern Mexico to this species. It is a common type in the fauna of Mexico, but includes many indubitable species. Mr. Schaeffer seems of late to be somewhat solicitous concerning the distinctness of *Lengi* and *rotunda* (Journ. N. Y. Ent. Soc., Sept., 1908); the two appear to me to be amply distinct species, indeed not even closely related.

H. imperialis, n. sp.—Moderately broadly oval, very convex, polished, black, rather finely but strongly, the elytra not very closely, punctate; head (♀) dull, black; pronotum black, the sides yellowish-red, the pale area longer than wide, parallel, with its inner margin bisinuate; elytra with the umboniform callus at basal fifth unusually pronounced, black, each with a large evenly elliptical dull red spot, from a fifth to six-sevenths of the length, and from inner fifth at apical fourth, where it approaches the suture most closely, to within a short but appreciable distance of the lateral margin; under surface and legs black throughout. Length, 3.6 mm.; width, 2.8 mm. Mexico (Puebla).

This very distinct species belongs to the same group as the Florida *regalis* and Mexican *panzosæ*. It differs from the latter in its more elongate form, much less basal pale elytral area, and in having the sides of the pronotum pale.

H. oculifera, n. sp.—Broadly oval, convex, shining, strongly and rather closely punctate, black, the entire head and a large subquadrate spot at each side of the pronotum pale (♂); elytra each with a rounded yellowish spot at posterior third, barely perceptibly more distant from the suture than the side margin; legs short, dark testaceous, the posterior piceous-black, though paler at the knees. Length, 2.1 mm.; width, 1.6 mm. Arizona (Benson), Nunenmacher.

Belongs near *Wickhami*, but differs in the stronger and rather closer punctures, larger eyes, with narrower interocular surface and in the position of the elytral spots, which are much more nearly on the median longitudinal line.

H. significans, n. sp.—Oval, convex, polished, moderately finely and sparsely but rather strongly punctate, strongly and closely so beneath, black, the entire head and narrow pronotal side-margins pale (♂), or with the former picescent and the side-margins nubilous (♀); elytra with a large and irregularly rounded lateral spot of red at the middle of the margin, by which it is diametrally truncated, and sometimes extending more than half way across the elytron; under surface piceous, rufescent peripherally, the legs slightly pale, the hind femora darker. Length, 2.2–2.5 mm.; width, 1.5–1.75 mm. Utah (St. George), Wickham.

May be placed near *pleuralis*, but differs in the much larger, red and less sharply-defined lateral spot, and much more elongate-oval form of body.

H. concurrens, n. sp.—Moderately elongate-oval, black or piceous-black throughout, polished, finely, not closely and rather strongly punctate; head (♂) pale, finely punctate and pubescent throughout; pronotum narrowly, nubilously rufescent at the sides; elytra without maculation of any sort; under surface piceous-brown, the metasternum densely punctate laterally. Length, 2.0–2.3 mm.; width, 1.4–1.65 mm. Utah (St. George), Wickham.

This distinct species may also be placed in the neighbourhood of *pleuralis*.

H. aterrima, n. sp.—Form nearly as in the preceding but smaller in size, deep black throughout (♀), or with the entire head and narrow, abruptly-defined sides of the pronotum yellow (♂); elytra without maculation, polished, finely, rather sparsely punctate; under surface more coarsely, less densely punctate, black, the tibiæ and tarsi feebly pallescent. Length, 1.6–2.1 mm.; width, 1.2–1.4 mm.—Utah (St. George), Wickham.

Differs from the preceding in its bright yellow and sharply-defined anterior markings of the male, but more particularly in the feebly punctate and wholly glabrous frontal surface. The eyes are notably larger and the front narrower in the male than in the female.

H. coloradana, n. sp.—Form moderately elongate, oblong-suboval, not very convex, polished, strongly, not densely punctate, black; head, except at each side of the basal margin, and sides of the pronotum abruptly and narrowly but not extending to the base, though finely throughout the apical margin, yellow (♂); elytra with a moderately narrow, abrupt, subparallel yellow side margin from base to apical third, and a rather small, widely detached subapical spot; under surface black, the anterior legs pale; mes-episterna pale in external half. Length, 2.2 mm.; width, 1.6 mm. Colorado (Boulder Co.).

Resembles the Californian *dissoluta*, Cr., very greatly, but has the yellow side margin of the elytra much less sinuated internally and shorter, the apical spot smaller and rather nearer the suture and the outer half of the mes-episterna pale, but, more especially, in the much less convex, more oblong and less oval form of the body.

H. serena, n. sp.—Coloration, lustre and punctuation throughout nearly as in *inflexa*, but with the expanded apex of the marginal reddish vitta less anteriorly extended; form of the body more narrowly oblong and parallel, not regularly oval as in *inflexa;* abdominal plate more broadly rounded and not quite attaining the first suture. Length 2.5 mm.; width, 1.7 mm. Pennsylvania, Warren Knaus.

Differs from *inflexa* in the form of the body and other characters.

H. Nunenmacheri, n. sp.—Rather broadly oval and convex, nearly as in *postica*, black, polished, sparsely but more distinctly punctate; head and pronotum (♀) black, the latter without trace of pale side margin; elytra each with a parallelogramic marginal yellow spot at base, twice as long as wide, ending abruptly behind and truncate, and also a transversely but broadly oval subapical spot, twice as far from the suture as the apical margin; beneath black throughout, the tibiæ somewhat, and the tarsi decidedly, pale. Length, 2.75 mm.; width, 2.05 mm. California (Riverside), Nunenmacher.

Allied to *postica*, Lec., but differs in the absence of the pale sides of the pronotum and in the presence of a short, broad, parallel humeral spot on the elytra.

H. protensa, n. sp.—Rather more elongate, narrow and parallel than any other species, shining, deep black above and beneath, the head and pronotum wholly black (♀), the elytra with a narrow even and feebly bisinuate yellow side margin, which is continuous throughout, though retreating from the edge posteriorly, not quite attaining the suture ; under surface feebly and rather sparsely punctate, the anterior legs pallescent. Length, 1.8 mm.; width, 1.15 mm. Arizona (Nogales), Nunenmacher.

Belongs near *limbalis*, the ornamentation being almost identical, though more closely approaching the suture at apex, but differing greatly in the narrower, more elongate and parallel and much less oval form of body, and also in the sparser and very much feebler punctuation of the under surface. *Spiculinota*, Fall, belongs to the *4-oculata* series, as do also the two following :

H. fidelis, n. sp.—Form slightly more broadly oval, convex, polished, black ; head black (♀), the pronotum with a similar lateral pale margin ; elytra similarly rather strongly punctate, with a narrow pale lateral border, which is feebly and broadly sinuate within, in basal two-thirds, a large subtriangular subapical spot and a discal spot twice as long as wide, the centre of which is only very slightly before the middle ; under surface black, the abdomen finely, sparsely punctate, the legs all pale red-brown, the metacoxal plate not quite attaining the apex of the segment, which it fully attains in *4-oculata*. Length, 2.3 mm.; width, 1.6 mm. California (Los Angeles).

H. Bensonica, n. sp.—Still more broadly oval and a little more convex, polished, black ; head pale, except at the basal margin (♂), the pronotum with narrow parallel pale sides ; elytra sparsely but strongly punctate, with a narrow yellow lateral border, which is strongly sinuated within and extending from the base to apical third, a transversely oval subapical spot and a circular discal spot at basal two-fifths, much in advance of the spot in *4-oculata* or *notatula ;* abdomen more closely and strongly punctate, the legs blackish, except the anterior, the metacoxal plate about attaining the segmental apex. Length, 2.0 mm.; width, 1.5 mm. Arizona (Benson), Nunenmacher.

In the true *4-oculata*, from the middle California coast regions, there is normally no yellow elytral margin or spots, but occasionally there are two very feeble elongate streaks, at base and behind the middle. The male has the black base of the front deeply angulate, while in the male of *notatula* the black at the base is transversely truncate, except at the sides, where the pale area extends further posteriorly along the eyes, in a way just the reverse of *4-oculata*. *Horni*, of Crotch, would appear to be different from *4-oculata* and not identical, as I suggested in my Revision, for the author states that it is smaller than *undulata*, shorter and rounder, more finely punctate, the elytra with a straight pale margin for two-thirds, a discal spot much nearer the base even than in that species and a triangular subapical spot. LeConte stated that it was a synonym of *lateralis*, but that is even more unlikely.

H. Octavia, n. sp.—Form nearly as in *undulata* but sensibly more broadly oval, more polished, deep black; head and pronotum (♂, ♀) almost similar, the latter more transverse; elytra more sparsely but more coarsely punctate, the punctures more impressed, each with three rather small and rounded, widely separated yellow spots along the sides, and one, discal and rounded, evidently before the middle. Length, 2.25–2.5 mm.; width, 1.6–1.8 mm. Mississippi (Vicksburg).

Related to *undulata* but differing in its more polished surface, coarser punctures, small, rounded, widely separated marginal spots, which never have any tendency to coalesce, in having the outer limit of the post-coxal arcs more distant from the abdominal side margin and the greater part of the mes-episterna pale in colour in the male, and not black throughout as in the male of *undulata*.

H. filiola, n. sp.—Elongate-oval, only moderately convex, obtuse before and behind, black, rather shining, the head alutaceous, the punctures rather strong and impressed but only moderately close-set; head and pronotum black throughout (♀); elytra with yellow side margin subequally wide throughout, bisinuate within, the apical part but little dilated, receding from the edge, nearly attaining the suture, and making an angle of about 100° with the part before it; each also with an elongate yellow spot, rather small in size, extending from three-sevenths to three-fifths of the length, and from inner two-sevenths not quite to the median line; under surface blackish, the tibiæ and tarsi paler. Length, 2.1 mm.; width, 1.1 mm. Arizona (Nogales), Nunenmacher.

This small but distinct species may be placed near *paludicola*.

H. revocans, n. sp.—Very small, rather broadly oval, broadly obtuse behind, shining, black, wholly glabrous; head and sides and apex of the pronotum rather broadly yellow (♂), the latter finely punctulate; elytra virtually impunctate, the punctures very minute, only visible under high power, the side margins from base to apical third, moderately sinuate within, and on each a large subapical transversely oval spot and a broad discal vitta, somewhat sinuate on each of its sides, from the scutellum obliquely backward to a little beyond the middle near inner third, yellowish-white; under surface piceous, the abdomen rather closely and strongly though finely punctate. Length, 1.4 mm.; width, 1.1 mm. Utah (St. George), Wickham.

This is a wholly isolated species, somewhat remindful at first of the genus *Hyperaspidius;* it may be placed just before *annexa* in the list but has no affinity with that species. The tarsal claws are obtusely swollen internally at base.

H. tetraneura, n. sp.—Nearly as in *4-vittata*, though very slightly more broadly oval and decidedly less convex, similarly rather strongly and closely punctate, black, polished; head black; pronotum (♀?) black, with a very narrow, not very abruptly pale side margin; elytra with the side margin evenly and very narrowly pale to but little beyond two-thirds, each also with a similarly narrow even pale oblique vitta from basal sixth, slightly beyond the median line, to apical fifth at inner third. Length, 2.3 mm.; width, 1.45 mm. Colorado (Boulder Co.).

Resembles *4-vittata*, but differs in the abruptly abbreviated and much narrower vittæ, more finely and sparsely punctate abdomen, and, especially, in the much more narrowly rounded post-coxal arcs, which scarcely attain the first suture, along which they are contiguous for some distance in *4-vittata*.

The species described by Mr. Schaeffer (l. c., p. 143) as *Hyperaspis trifurcata*, is strongly remindful, in its form and general scheme of ornamentation, of a species published by me under the name *Hyperaspidius insignis*, and I would therefore advise a closer scrutiny of its generic characters. The species, though, is doubtless different.

Hyperaspidius, Cr.

The species described by LeConte under the name *vittigera* is not by any means the same as the Mexican *trimaculatus*, Linn., as becomes apparent at once on reading Mulsant's description of the latter. The species should therefore be known under LeConte's name, *vittigera* (= *trimaculatus*, Cr., nec Linn.).

H. pallescens, n. sp.—Broadly oblong, very obtuse at apex, moderately convex, polished; head and pronotum (♀) rufo-testaceous, the latter subimpunctate, with a narrow yellowish-white side margin; elytra rather finely and sparsely but strongly and evenly punctate, smooth, pale reddish-brown, the basal and lateral margins, retreating from the edge posteriorly, and not quite attaining the suture at apex, whitish, the basal stripe prolonged posteriorly, near the suture, touching or feebly joining the apex of the marginal stripe; legs pale. Length, 1.3 mm.; width, 1.0 mm. Arizona (Nogales), Nunenmacher.

Allied to *vittigera* but smoother, more broadly oblong and differing in colour. The prothorax is but little narrower than the elytra and two and one-half times as wide as its greatest length. The species from El Paso, which I identified as *trimaculatus*, Linn. (Rev., p. 130), is as follows:

H. oblongus, n. sp.—(= *trimaculatus*, Csy., nec Linn.).—Differs greatly from *vittigera*, Lec., in the ornamentation of the male pronotum, which is said to be yellow, with a large basal black spot anteriorly lobed and extending beyond the middle in that species, according to Crotch (Rev., p. 232). It occurs in Missouri.

A REMARKABLE CECIDOMYIID FLY.

BY T. D. A. COCKERELL, BOULDER, COLORADO.

On Sept. 24, 1908, as I was walking down Seventeenth St, Boulder, Colorado, I noticed a very singular fly upon the pavement. At first sight I thought it might be a small Bibionid of some sort, but when I had it in the bottle, I was delighted to find that it was a most peculiar Cecidomyiid. It is one of the *Hormomyia* group, the first to be recorded from the West. I describe it as a *Hormomyia*, though its peculiar characters may eventually entitle it to a separate generic name.

Hormomyia coloradensis, n. sp.

♂.—Length, 5¼ mm.; wings almost 6; thorax blood-red, so arched over head that the latter is quite invisible from above, and only the eyes can be seen from an angle of about 45° in front; dorsum of thorax with short scanty black hair; head pale; antennæ dark, at first sight appearing 26-jointed, but really 14 jointed, the joints after the first two being divided into a basal swelling and an apical double swelling, each of the three swellings (counting the apical as two) ornamented with small white loops, while the lowest and highest each emit many long black bristles; all this being exactly as *Xylodiplosis præcox* (Bull. Soc. Ent., France, 1895, p. cxii), except that the long bristles are much longer, being much more than twice the length of the loops; wings strongly dusky, with much dark hair and a conspicuous dark fringe; legs very thick, almost

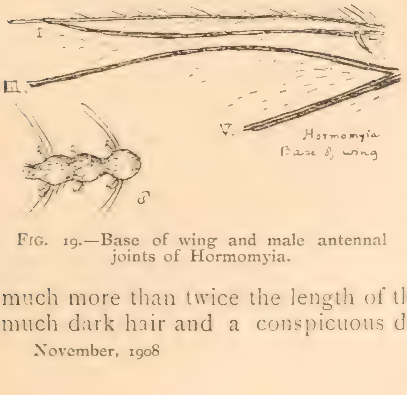

FIG. 19.—Base of wing and male antennal joints of Hormomyia.

spider-like, dark reddish, with short black hair; coxæ and trochanters red; first tarsal joint very short, second long; claws slender, simple; abdomen shining red-brown, except first segment, which is pale reddish; segments 2 to 6 each with four transverse red spots, the midmost pair more basad than the others; sides and under surface of abdomen with black hair; claspers very small.

The venation is in general like that of typical *Hormomyia* (Williston, N. A. Dipt., 3rd Ed., p. 119, f. 4), except that the third vein does not bend down so much apically, while the lower branch of the fifth bends down more, entering the margin practically at right angles. There is, however, a much more remarkable character; the third vein is continued straight to the base of the fifth (it is reddish and very distinct), and *the little cross-vein to the first, which is supposed to be the real beginning of the third, is totally absent.** There is a little vein leaving the first just above the origin of the third from the fifth, continuing a short distance obliquely downward and *basad*, and failing to connect with anything. I have examined the specimen over and over again with the lens and compound microscope, and there is no doubt about the structures. This affords, I think, a strong argument in favour of the view that the third vein is the real media (as I have suggested in my studies of Nemestrinidæ), the so-called cross-vein being part of it. According to this view, the condition found in *Sciara*, various Cecidomyiidæ, etc., is genuinely primitive, and a further investigation of these types may be expected to yield significant results.

NOTES ON THE GENUS *SITARIDA*, WHITE.

BY F. CREIGHTON WELLMAN, M. D., F. E. S., WASHINGTON, D. C.

The Australian Meloid genus *Sitarida* was founded by White in 1846 on *Sitarida Hopei*, a new species described by himself. The type, from New Holland, was a single ♀, which is still in the British Museum. In 1863 Pascoe erected the genus *Goetymes* for the reception of his newly-described *Goetymes flavicornis*, from Port Stephens, represented by a single ♂ specimen (type), also in the British Museum.

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*On one side only there is a thin colourless line, no thicker than the hairs on the same part of the wing, passing from the first vein to the third. It seems not to be a rudiment of a vein. At the base there is a thin colourless thread passing from the first to the third, touching the tip of the broken vein and ending a little before the forking of the third and fifth.

The only real differential character given by Pascoe for the separation of *Goetymes* from *Sitarida* is indicated in the following words: "The nearest ally of this genus is *Sitarida* White. from which, *inter alia*, it differs, as it does from every other of the family, in its flabellate antennæ." It need hardly be pointed out that the above-mentioned difference is nothing more than a sexual dimorphism, and a comparison of the types of the two genera has convinced me that they not only belong to the same genus, but that they probably even represent the sexes of one species. I am the more encouraged in this idea by finding while looking through the literature that Mr. Waterhouse has apparently held the same view, as Beauregard (*Les Ins. Vés.*, p. 407) writes: "M. Waterhouse m'a dit qu'il avait des raisons de croire que *Sitarida* et *Goetymes* ne sont que le ♂ et la ♀ d'une même espèce." The differences in the antennal structures of the specimens examined by me may be given in Pascoe's own words, as follows: "In both they are 11-jointed; but in *Sitarida*[1] the first four are simple, while each of the remaining seven throws out laterally and at the base a short square lamina, this portion of the antenna being, in fact, pectinate. In *Goetymes*[2] the first three joints only are simple, the remainder being drawn out into long laminæ, closely applied to each other at the base, and forming a compact mass when at rest." The other differences relate chiefly to the size and colour of the specimens, with the exception that the thorax in the ♀ is (as would quite be expected) somewhat more coarsely punctured than in the ♂. It may be added that the examination of the single specimens in the British Museum shows that both have simple claws, a character not elsewhere met in the family except in *Hornia*.[3]

Two additional forms, both of them evidently distinct, have been described, and, treating White's and Pascoe's species for the time being as separable, the list of species now stands as follows:

Genus—*Sitarida*, White, Stoke's Discov. in Austral., I, 1846, p. 508.
Goetymes, Pascoe, Journ. Ent., II, 1863, p. 47.

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[1] The female.

[2] The male.

[3] Westwood's statement (Trans. Ent. Soc. Lond.. 1875, p. 226), that his genus *Deridea* has simple claws, is a mistake; the claws, while very small, are of the usual Meloid type, as may be seen under the low power of a compound microscope.

Species—1. *Hopei*, White, *loc. cit.*, p. 508, tab. 2, fig. 2, ♀ *(Sitarida)*. New Holland.

Large species, black, head convex, strongly rounded in front, coarsely sculptured, thorax subtrigonate, sides slightly rounded, coarsely punctured, legs robust, tarsi short.

2. *flavicornis*, Pasc., *loc. cit.*, p. 48, tab. 2, fig. 5, ♂ (*Goetymes*), Port Stephens.

Smaller than preceding, pale fulvous, head and thorax more finely punctured, the latter with a cruciform impression on disk.

3. *pictipes*, Blackburn, Trans. Roy. Soc. S. Austral., XXIII, 1899, p. 69, ♂ (*Goetymes*), Melbourne.

Half the length of *Hopei*, black, head and thorax closely and rather strongly punctulate, the latter transverse, canaliculate, elytra light brown, tibiæ and tarsi yellow.

4. *minor*, Champion, Trans. Ent. Soc. Lond., 1895, p. 274, tab. 6, fig. 11, ♀[4] *(Sitarida)*, Hobart (Tasmania).

Much smaller than preceding, head and thorax closely punctate (but with vertex sparsely so, and occiput almost smooth), vertex broadly and abruptly raised, subtruncate at summit, thorax strongly transverse, with two smooth transverse tubercular elevations on disk; legs very slender.

The following artificial table, based on the thoracic characters, may aid in separating the above forms :

A. Thorax canaliculate.
    Thorax transverse, coarsely and rather strongly punctulate.............................. ♂ *pictipes*.
AA. Thorax not canaliculate.
    a. Thorax subtrigonate, sides slightly rounded.
        a. Thorax coarsely punctured.................. ♀ *Hopei*.
        aa. Thorax more finely punctured, and with cruciform impression on disk.................. ♂ *flavicornis*.
    aa. Thorax strongly transverse.
        Thorax closely punctate, and with two smooth transverse tubercular elevations on disk.................. ♀ *minor*.

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[4] Champion gives his insect as a male, but judging from his description and figure (I have not seen his type), I think this must be a mistake. If his determination of the sex should prove to be correct, it would necessitate the erection of a new genus.

THE RHOPALOCERA OF SANTA CLARA COUNTY, CALIFORNIA.

BY KARL R. COOLIDGE, PALO ALTO, CALIF.

Santa Clara County borders on the Bay of San Francisco, extending back therefrom through the Santa Clara Valley to the Santa Cruz Mountains, which perhaps average 2,500 ft. in altitude. Owing to the diversity of the topography, many species are found to be very locally confined. For instance, *Gæides gorgon* is but rarely met with in the valley, its habitat being on the hot, dry hillsides where *Eriogonum* thrives. The home of the *Argynnids* is on the highest ridges, and they are seldom seen elsewhere. To the bay region no species are strictly confined, but some of the *Lycænidæ* and *Hesperidæ* are more abundant there than elsewhere. Along the inner sloughs, where *Salix* occurs, a few species, such as *Papilio rutulus* and *eurymedon*, *Basilarchia Lorquinii* and *Limenitis Bredowii*, var. *californica*, which have willow or oak for their food-plant, are common. In the valley proper a great majority of the species occur. There is a sharp distinction in the faunal aspects, although only a few hundred feet difference in altitude between the valley and the foothills. In the hills, *Mimulus* and *Castileja* furnish food for the *Lemoniids*, which fly in countless numbers. Many species of *Lycænidæ* have for their food-plants *Lupinus*, *Æsculus* and *Hosackia*, which occur everywhere in the hills. To the mountain region a number of species, such as *Chrysobia mormo*, *Habrodias grunus* and others, are confined. Thus, one might collect here for years and then not have taken all the species. This localization can be accounted for directly by the range of the food-plants. In the open fields of the valley, *Euchloë sara* and *ausonides* are common, flying about *Brassica*, their food-plant. Ascending into the hills, *ausonides* becomes rarer and higher up is never met with. *Sara*, on the other hand, flies almost everywhere, but I am quite positive that in the hills it has a different food-plant, as mustard is "few and far between," and *sara* is often found far away from it. I might say here that I do not believe in determining species by the localities from which they come. It should be remembered that butterflies, like other insects, must be allowed some variation which the effects of climate, etc., impose upon them. In some of our genera, particularly *Argynnis* and *Lemonias*, which have many western species, a large number of these so-called species will prove but geographical forms of others. Lepidopterists distinguish between *Lemonias Wrightii* and *leanira* because one is from Southern California and the other from farther north. If a ♀ *Wrightii* (from Los Angeles) and a ♂ *leanira* (from San Francisco) should meet, I am sure they would never take each other for foreigners. In fact, in a long series of specimens from either locality you might pick out "types" of either form, and besides find a couple of "new" species. The value and necessity of western local lists is thus shown. The sooner we know better the range, etc., of some of these doubtful species, the sooner we shall be able to place them correctly in our catalogues. The following list is, I think, quite complete, except in the *Hesperidæ*, to which I hope to make numerous additions.

I am deeply indebted for various notes and favours to Mr. J. G. Grundel, of Alma; Mr. F. X. Williams, of San Francisco; Mr. Fordyce Grinnell, jr., of Pasadena, and Mr. E. J. Newcomer, of Palo Alto.

PAPILIONIDÆ.

Papilio eurymedon, Boisd.—The commonest of the genus here, flying from April to July. The food-plant is *Rhamnus californicus*.

Papilio rutulus, Boisd.—Not as abundant as *eurymedon*. The usual food-plant is *Salix*, but also *Rubus* and *Magnolia*. May to September.

Papilio zolicaon, Boisd.—Fairly common from May to November. The larva feeds on *Umbelliferæ*, particularly *Fœniculum vulgaris*.

Papilio polyxenes, Fab.—Probably the variety *asteroides*, Reakirt. I have not seen it, but it is reported to be common at Santa Clara. The larval food-plant is probably *Daucus carota*.

Laertias philenor, Linn.—Rare. It has been takenin February and September. The larva, as in the east, feeds on the Dutchman's Pipe *(Aristolchia serpentaria)*, which is very rare in this county.

PIERIDÆ.

Pontia occidentalis, Reak.—Common everywhere in the valley. The variety *calyce*, Edw., is the cold-weather form.

Pontia protodice, Boisd.—Rare. *Protodice* is the southern representative of *occidentalis*, and this is about the northern limit of its range. The variety *vernalis*, Edw., is the cold-weather form, appearing in late winter and spring.

Pontia napi, Linn.—The varieties *venosa*, Scudder, and *castoria*, Reakirt, are not rare in the lower foothills, where their food-plant grows.

Pontia rapæ, Linn.—Superabundant everywhere, except in the higher mountains, where it is rarely met with.

Euchloe ausonides, Boisd.—One of our earliest species, appearing sometimes as early as February. The life-history was described in the May "Entomological News" by Mr. E. J. Newcomer and myself.

Euchloe sara, Boisd., and *Reakirtii*, Edw.—Also common and early. *Reakirtii* is the spring and *sara* the summer form. The larval habits are much similar to those of *ausonides*.

Zerene eurydice, Boisd.—Not common. It is abundant to the north in Marin and Sonoma counties, where its food-plant, *Amorpha californica*, is found.

Eurymus eurytheme, Boisd., and varieties *ariadne*, Edw., and *keewaydin*, Edw.—Very common everywhere, especially flying about the flowers of *Brassica*, *Radix* and alfalfa.

NYMPHALIDÆ.

Agraulis vanillæ.—Very rare. I have taken but a single specimen, in late August. The larva feeds on *Passifloræ*, the Passion vines.

Argynnis coronis, Behr.—Common throughout California. In this county it appears toward the end of May, sometimes earlier, and is also found on the wing in August and September. Like the other local *Argynnids*, except, perhaps, *callippe*, it flies almost altogether in the mountains, about the flowers of the wild tansy, which grows on the dry hillsides. The larva feeds on wild violet.

Argynnis liliana, Hy. Edw.—*Liliana* is intermediate between *callippe* and *coronis*, partaking of the characters of both. It is not at all rare in the Santa Cruz Mountains, emerging towards the middle of June and flying about the flowers of the wild tansy. Food-plant wild violet.

Argynnis callippe, Boisd.—This species is the most common one in the lower foothills and valleys. I have seen quite a number in early fall about the sloughs of the marshes near the bay. There is but one generation, the imagines emerging in June and July. As with our other local species of this genus, the food-plant is *viola*.

Argynnis adiaste, Behr.—The habits of *adiaste* are much similar to those of the preceding species. It usually appears about the end of June, but this year I took many fine specimens the last day of May. Females were also quite common this year, whereas they are ordinarily quite rare. *Adiaste* is very limited, only occurring, so far as known to me, from San Francisco (San Francisco County) to Santa Cruz (Santa Cruz County), a distance of about eighty miles.

Argynnis egleis, Boisd.—I have not seen this species, but Mr. Grundel tells me it is not rare at Mt. Hamilton in early July.

Brenthis epithore, Boisd.—*Epithore* flies in the open patches near shaded woods, where its food-plant, *viola*, is found. I have never seen it in the lower hills or valleys.

Lemonias chalcedon, Dbl. and Hew.—Very abundant and variable. The larva feeds on a variety of plants, more especially *Mimulus*, *Castileja*, and occasionally *Rosa*. Last summer I saw a curious female aberration in the collection of Mr. J. C. Grundel, and as he has taken another similar one this season, I consider it sufficiently constant to be worthy of a name.

Lemonias chalcedon aberr., *Gründeli* aberr., nov.—♀. On primaries the spots are produced into long bars, which are arranged more or less regularly into three series, the outer two somewhat rounded; very little red, except on outer margin. On secondaries the markings are in the shape of long yellowish bars, eight in number; a very fine marginal border. Beneath, on primaries the markings are repeated apically, as in typical specimens. On the secondaries the bars are repeated and are broken centrally by an irregular ferruginous band; base ferruginous, with several black patches. Expanse, 2.10 inches. Cathran Gulch, Wright's Station, Calif., May 17, 1902. The ornamentation above resembles that of *Lemonias Hoffmanni* aberr., *mirabilis*, Wright (Butt. West Coast, pl. XX, fig. 184 and b). The specimen taken this year is somewhat smaller, and the black basal area of the upper wings is produced further exteriorly. Otherwise it is much similar.

Lemonias palla, Boisd.—Plentiful in the canons. It is dimorphic, two forms of females being found, one a foxy-reddish colour and the other blackish. All intergradations may be found. *Eremita*, Wright, and *sabina*, Wright, are females of *palla*. This species is confined more to the foothills, like *leanira*, and unlike *chalcedon*, does not occur in the valley. The known food-plants are *Castileja* and *Plantago*.

Thessalia leanira, Boisd. Not uncommon. Specimens vary greatly in size, from 1.40–2.00 inches. The variety *obsoleta*, Hy. Edw., was described from San Rafael, in Marin County, and probably occurs here. Nothing is known of the preparatory stages.

Phyciodes pratensis, Behr.—Quite plentiful. May be found in numbers about puddles in early summer. The larva feeds on *Carduus*.

Phyciodes mylitta, Edw.—Much rarer than *pratensis*. The food-plant is the same as the preceding.

Polygonia satyrus, Edw.—This is our commonest angle-wing, and may be found flying a greater part of the year.

Polygonia satyrus, var. *marsyas*, Edw.—A darker form than *satyrus*, which I take to be the variety *marsyas*, is much rarer than the lighter. The food-plant of this and the preceding is nettles.

Polygonia zephyrus, Edw.—May be found sparingly along roadsides and open spots in the canons where water is found. Wright, in his Butterflies of the West Coast, states that "the larval food-plant of all Graptas is nettles," but the larva of *zephyrus*, as is well known, feeds on *Azalea occidentalis* and the elm, hop-vine and various species of the *Grossulaceæ*, furnish food for other species.

Eugonia californica, Boisd.—Flies in the mountains where its food-plant, *Ceanothus*, is found. Seldom seen in the valley. It appears to have been plentiful in the past, but has since become quite rare.

Euvanessa antiopa, Linn.—The "mourning cloak" practically flies here the year round, as it often comes out of its hibernation on warm days. The variety *hygiæa*, Heyd., has been reported from San Jose.

Vanessa atalanta, Linn.—Abundant, its habits being simiiar to those of the preceding.

Vanessa huntera, Fabr.—Not so common. Until this season I had only seen one specimen, but I found it abundant enough on dry hillsides flitting about various flowers.

Vanessa cardui, Linn.—Common everywhere.

Vanessa caryæ, Hub.—Another common species, the larva feeding on *Malva*. I have not observed the aberration *Muelleri*, Letcher.

Junonia cœnia, Hub.—Always quite common. Food-plants *Plantago* and *Antirrhinum*, preferably the latter.

Basilarchia Lorquinii, Boisd.—Plentiful in the vicinity of *Salix*, its food-plant.

Limenitis Bredowii, Hub., var. *californica*, Butl.—Not rare. The larva feeds on the young tips of *Quercus*, and is very similar to *Basil. Lorquinii.*

AGAPETIDÆ.

Cercyonis alope, Fabr., var. *boopis*, Behr.—Rather rare. It appears in July.

Cercyonis charon, Edw.—Confined to the hills and mountains. Early July.

Cœnonympha californica, Dbl. and Hew.—Common.

LYMNADIDÆ.

Anosia plexippus, Linn.—Occasionally seen, but by no means abundant. As in the east, the food-plant is *Asclepias*.

RIODINIDÆ.

Chrysobia mormo, Feld.—Found only on the dry and sandy hillsides with its food-plant, *Eriogonum*. The larva is nocturnal, hiding in the daytime in the leaves and rubbish at the base of the plant, where pupation also occurs. The female, *Argynnid*-like, sometimes drops her eggs while on the wing.

LYCÆNIDÆ.

Habrodias grunus, Boisd.—I have collected this species commonly in fall in the mountains, flying about its food-plant, *Quercus chrysolepis*, Lieb.

Atlides halesus, Cramer.—Very rare. I have only seen one specimen from this locality. The larva feeds on *Phoradendron villosum*, Nutt., with which *Quercus* is badly parasitized.

Uranotes melinus, Hubn.—Appears in late June, and is then abundant, flying about the flowers of *Brassica*, *Radix* and others. The larva lives on the flower-buds of *Malva*.

Thecla sæpium, Boisd.—Scarce, several specimens have been taken in the mountains in September.

Incisalia iroides, Boisd.—I have not examined specimens of this species closely, but I have seen several specimens collected at Alma, which I would consider as belonging to this species.

Callophrys dumetorum, Boisd. (= *affinis*, Edw., = *viridis*, Edw.).—Not rare in the foothills from April to May. The larva feeds on the buds of *Hosackia*.

Tharsalea arota, Boisd.—*Arota* flies in the mountains in late June about the flowers of *Ceanothus*. The larva feeds on *Ribes*.

Gæides xanthoides, Boisd.—Sparingly found in June and July on the blossoms of *Brassica*.

Gæides editha, Mead.—Occasionally seen, but not at all common.

Gæides gorgon, Boisd.—Rather common in the mountains in the vicinity of its food-plant, *Eriogonum*. The habits of the larva are quite similar to those of *Chrysobia mormo*. The imagoes emerge, as a rule, in early June, and the females are quite scarce.

Epidemia helloides, Boisd.—Quite common everywhere. The food-plant is *Polygonum aviculare* and others of that genus.

Cupido icariodes, Boisd.—Not rare in early spring in the foothills, flying about *Lupinus*, upon which the larva feeds.

Nomiades antiacis, Boisd., var. *Behrii*, Edw.—Usually not uncommon in the valley, flying from May to November. The food-plant is *Lupinus* of several species.

Philotes sonorensis, Feld.—This species I have not met with myself, but Mr. Grundel has taken two at Alma, both in February. W. G. Wright (Butt. West Coast) gives Gilroy, in this county, as the extent of its northern range, and I believe it has been collected there by earlier collectors.

Rusticus acmon, Boisd.—Abundant in spring and fall. The larva feeds on *Hosackia*. This species is much given to variation, and I think good series from various localities would show that a number of so-called species are but forms of this.

Cyaniris ladon, Cramer, var. *piasus*, Boisd.—This is one of the earliest and commonest butterflies in California, where it replaces the Atlantic *ladon (pseudargiolus*, Boisd. and Lec.). The caterpillar feeds on the flowers of the California Buckeye *(Æsculus californicus).* Feb. to July.

Everes amyntula, Boisd.—Common in May and June. Frequents the flowers of *Æsculus*, which is most probably the food-plant.

Brephidium exilis, Boisd.—Abundant, except in the hills, from May to June. The food-plant is *Atriplex*.

HESPERIIDÆ.

Anthomaster agricola, Boisd.—Rather common on flowers in August and September.

Anthomaster pratincola, Boisd. (?)—Several specimens taken at Black Mountain in September and October appear to belong to this species.

Hylephila campestris, Boisd.—Not rare in early fall.

Polites sabuleti, Boisd.—Flies from May to September.

Phycanassa melane, Edw.—May to October. Not common.

Thanaos propertius, Lint.—Flies in early April and May quite abundantly.

Thanaos clitus, Edw.—Common. I am in doubt as to the correct identification of this and the preceding.

Hesperia ericetorum, Boisd.—Rare. I have seen but a single specimen taken in this county.

Hesperia tessellata, Scudder.—Common everywhere. The fact that the life-history of *tessellata* has been fully described by French in his Butterflies of the Eastern United States (Supp., p. 404), appears to be overlooked. In this locality the larva feeds on *Malva borealis*, and I have found eggs, pupæ and larvæ in all stages. Much irregularity is exhibited. On October 14th I observed a female ovipositing, and collected a number of eggs. Two eggs hatched October 18th, and on the 20th two more. The remaining two did not hatch until the middle of December. The larva emerges from the egg by eating out a round circular hole at the apex. The pupa is formed in the leaves.

Hesperia cæspitalis, Boisd.—Occasional in the mountains, from April to July.

MEIGEN'S FIRST PAPER ON DIPTERA.

Since the publication of my article in the October number, page 370–373, I have received Vol. III of Kertész's Catalogus Dipterorum, and I notice that he accepts all of the 1800 names that come within the limits of this volume, five in number. I also have received the September number of the Wiener Entomologische Zeitung, in which Dr. Bezzi reviews Kertész's third volume. He makes the remarkable admission that the rules of the International Zoological Congress perhaps do not justify the use of the 1800 names, but at the same time praises Kertész for adopting them. As the admission is fatal to the case built up by Hendel and Bezzi (with the present co-operation of Kertész), I deem it advisable to quote his exact language (Wien. Ent. Zeit., XXVII, 252):

"In diesem Bande hat sich der Herr Verfasser streng an das Prioritätsgesetz gehalten; wir finden fünf Neigensche Gattungen von 1800 wieder in Gebrauch gestellt, und zwar *Potamida* für *Ephippum*, *Hermione* für *Oxycera*, *Eulalia* für *Odontomyia*, *Erinna* für *Xylophagus* und *Chrysozona* für *Haematopota*. Aus demselben Grunde sind auch *Solva*, Walker, für *Subula* (*Xylomyia*, Rond.), *Pantophthalmus*, Thunb., für *Acanthomera* und *Rhagio* für *Leptis* gebraucht. . . . .

"Ganz besonders hervorzuheben ist die richtige Nomenklatur, welche, wenn auch nicht immer den neuen internationalen Regeln entsprechend, jedenfalls mit den klassischen Grundsätzen der Wissenschaft übereinstimmend ist."

As I showed last month, it was Dr. Bezzi and Mr. Hendel together who worked up the 1800 paper of Meigen; we now have the feeble suggestion of one of them that their proposed names, "even if not entirely in agreement with the new International rules, are, at any rate, in harmony with the classic principles of science."

I surely need not pursue the subject further.

J. M. ALDRICH, Moscow, Idaho, Oct. 10, 1908.

A CORRECTION.

On page 349 of this volume, the expanse of wings of *Argyroploce abietana*, n. s., should have been given, 11–13 mm. and not 21–23 mm.

C. H. FERNALD.

Mailed November 3rd, 1908.

DR. JAMES FLETCHER.

The Canadian Entomologist.

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DR. JAMES FLETCHER.

It is with the most profound regret that we record the death of our very dear friend, Dr. James Fletcher, which occurred on Sunday morning, Nov. 8th. For the last two years his health had not been entirely satisfactory, and for more than a twelvemonth he had been troubled more or less with an internal hemorrhage, which caused him much inconvenience and discomfort at times, but which he did not regard as particularly serious. His cheery habit of mind caused him to treat lightly symptoms which would, in most cases, have excited much alarm. In the middle of September he went out to British Columbia on his annual visit, and was absent from home for about six weeks. On his return his colleagues noticed that he had not benefited as much as usual by the trip, and that his appearance was by no means robust. But with characteristic energy he at once set to work to make the arrangements for the Annual Meeting of the Entomological Society of Canada, which he desired should be one of the most successful in its history. As President for the second year in succession he expected to retire from office, but fully counted upon being present at Guelph and occupying the chair at the various sessions which were held on Nov. 5th and 6th. During the preceding week, however, he wrote saying that he was going to Montreal to consult a specialist, and might after all be unable to attend. He went down on Saturday, the 31st of October, and was at once sent to the Royal Victoria Hospital, there to prepare for an operation. To the writer he sent a letter the following day, expressing his great disappointment at being laid up and prevented from coming to Guelph, but full of confidence in the wonderful power of modern surgery, and with apparently no fears as to the result. The operation took place on the following Saturday, but he failed, owing to his weak condition, to rally from it, and the next morning he died. The operation revealed that he had been suffering for some time from a malignant tumour, which had sapped his vitality, and would very soon, in any case, have brought his life to a close. Up to the end he was cheerful and uncomplaining, free from despondency or anxiety about himself and full of the happy optimism which had always been one of his charming characteristics.

Few men ever made so many loving friends in all walks of life; every one who came to know him could not fail to become warmly attached to him. There are many sad hearts grieving at his loss all over the Dominion of Canada, and many, too, in widely-scattered places in the United States. Old and young, rich or poor, learned or ignorant, children and their elders, it made no difference—he had a kindly word for each one, and most can treasure in their memories a kindly deed as well. When he addressed a meeting he captivated his audience at once, and when he joined an excursion of nature students all were eager to be with him and learn from him some of the secrets of the woods and fields that he knew so well. We shall not see his like again, but we may all feel that it was good for us to have known him—his memory will long live in our hearts—his noble words and generous deeds will be happy recollections for many a year to come.

Dr. James Fletcher was born at Ashe, in the County of Kent, England, on March 28th, 1852. He was educated at King's School, Rochester, and came to Canada in 1874 to fill the position of a clerk in the Bank of British North America. Finding the work uncongenial, after two years he gave it up and became an assistant in the Library of Parliament at Ottawa. All his spare time he devoted to Botany and Entomology, and became, as years went on, a recognized authority in each of these branches of natural science. This led to his appointment as honorary Dominion Entomologist and Botanist, and a year or two later to his taking up the work of these departments at the newly-established Experimental Farm. This was in 1887, and for twenty-one years he has been a highly-valued assistant to Dr. Saunders, the Director, and long since became known throughout North America as one of the ablest scientific men of the day in his special departments.

In 1878 he became a member of the Council of the Entomological Society of Ontario, and every year since he has been elected to hold some office in it, being four times Vice-President, and President for three years, from 1886 to 1888, and again from 1906 to the time of his death, when he had just been re-elected for another year. His first contribution to the Society's publications was an article on Canadian Buprestidæ, which was published in the Annual Report for 1878, and his first paper in this magazine appeared in January, 1880. During all the years that have followed, no volume of either publication has been issued without some valuable articles from his pen.

In 1879 he was one of the originators of the Ottawa Field Naturalists' Club, the most successful society of the kind in the Dominion, and more recently he suggested, and by his energy and influence accomplished, the formation of the important Association of Economic Entomologists of North America, of which he was elected President in 1892. He was also one of the orginal Fellows of the recently-formed Entomological Society of America, and was First Vice-President last year. In 1886 he became a Fellow of the Linnæan Society of London, and in 1896 he received the degree of LL.D., *Honoris causa*, from Queen's University.

In 1885 he was elected a Fellow of the Royal Society of Canada; in 1895 he became President of Section IV, which is devoted to Geological and Biological Sciences. For many years he was Honorary Treasurer of the Society, and for the last two years Honorary Secretary. To the Transactions of the Royal Society he contributed the following papers: Presidential Address, 1895, on Practical Entomology; Recent Additions to the List of Injurious Insects of Canada, 1899; The Value of Nature Study in Education, 1901; Descriptions of Some New Species and Varieties of Canadian Butterflies, 1903; Notes on the Preparatory Stages of Some Species of Canadian Lepidoptera, 1907.

A list of his contributions to scientific and agricultural journals would occupy many pages, if such a list could be completely carried out. His most valuable publications were his annual reports on the work of his department at the Central Experimental Farm and the Bulletins in connection with it, in which he gave accurate detailed descriptions of a very large number of injurious insects, and also his papers in the annual reports to the Legislature of the Entomological Society of Ontario. Two years ago he completed an admirable work on the Farm Weeds of Canada, containing descriptions of all the most important weeds that are a trouble to agriculturalists throughout the Dominion; a handsome quarto volume, illustrated with 56 beautiful coloured plates.

Not only with his pen, however, did he perform useful work, but with his voice as well. He was in great demand as a public speaker at Agricultural, Horticultural and Fruit-growers' conventions, meetings of Farmers' Institutes and other gatherings. On these occasions he at once secured the attention of his audience, and charmed them with his graceful language and lively humour. No one else, indeed, has done so much for Canada in instructing the people in a practical knowledge of their worst insect foes and the best methods of dealing with them. His work has thus been of vast importance, not only to those directly interested in the products of the soil, but indirectly to all the dwellers within the domains of this wide Dominion.

Though so fully occupied with scientific work, he yet found time for other things. He was one of the most efficient members of St. Luke's Hospital Board; for many years lay-reader and superintendent of the Sunday School in Holy Trinity Church, Archville, a suburb of Ottawa, and an active member of the St. Andrew's Brotherhood. His religous life as a devout son of the Church of England was known, perhaps, to but few amongst his intimate friends, though manifested in many ways through his goodness of heart; he lived and died an earnest God-fearing man, devout and upright, filled with unobtrusive piety, a sincere Christian indeed, "in whom was no guile."

While we deplore the loss that we all feel we have individually sustained, we desire to express to his sorrowing family, Mrs. Fletcher and her two daughters, the deepest sympathy with them in their sad bereavement. To them the loss is beyond all words, but it may afford them a ray of comfort to know that he whom now they mourn was so widely beloved, admired and respected, and that so many friends share in their grief and are filled with sorrow for him who is gone.

C. J. S. BETHUNE.

DR. L. O. HOWARD, Chief of the Bureau of Entomology in the Department of Agriculture at Washington, a friend of many years' standing, writes as follows:

"Dr. Fletcher's services to his country were great. He had a wonderful grasp of a very broad field in entomology, and was one of the best-informed men of his time on the intricate and manifold aspects of economic entomology. His reports were sound and practical, and as a public speaker before assemblages of agriculturalists and horticulturists he was unexcelled. His address years ago before the National Geographic Society in Washington, on the Canadian Northwest, was one of the most perfect lectures I ever heard. He was known, admired and loved all through the States. I fact, I have never known a man who had so many absolutely devoted friends as Dr. Fletcher. His energy, his enthusiasm, his absorbing interest in everything that lives and grows, his warm heart, his cheeriness, his perfect lack of even a suspicion of egotism, attracted every one who knew him, and bound them to him in friendship, and even love, forever. Here in Washington among the entomologists and others there are many sad hearts to-day."

DR. WILLIAM H. ASHMEAD.

On the 17th of October, Dr. William Harris Ashmead died in Washington, D. C., aged 53 years. For more than a year he was in such an unsatisfactory state of health that his recovery appeared impossible, and it was therefore no surprise to learn that the end had at last arrived. His breakdown in the midst of a career of scientific usefulness was evidently brought about by overwork; he devoted himself with such intensity to the study of the Hymenoptera and the publication of the results that he gave himself no rest, and literally wore himself out, to the grief and distress of his family and many friends.

For close upon thirty years he was a constant contributor to the pages of this magazine, his first articles on insects affecting the orange having appeared in 1879. At that time he lived in Jacksonville, Florida, where he was engaged in the publishing business, which included the issue of a daily paper and a weekly agricultural journal. He was naturally much interested in the production of oranges, and his attention thus became drawn to the insects injuring the trees and fruit, and those parasitic forms that somewhat kept them in check. His work was so thorough that he was made a field entomologist for the United States Department of Agriculture in 1887, and began his career as a professional entomologist.

In 1890 he went to Germany and studied for some time in Berlin, thus becoming qualified for the performance of scientific work of a high character. In July, 1897, he was appointed a Curator of the Department of Insects in the U. S. National Museum at Washington, and continued to hold the position till incapacitated by illness.

In October, 1904, he was elected an honorary member of the Entomological Society of Ontario in recognition of his eminence in the science and the valuable contributions that he so constantly made to the pages of the Canadian Entomologist. His studies were devoted to the Hymenoptera, and he published many systematic papers on various superfamilies in the order and described a large number of genera and species. His work was of such a high character that it is regarded as authoritative, and has attracted the attention of the leading entomologists of both Europe and America. One of his completed works is his Monograph of the Proctotrypidæ, a volume of nearly 500 pages, published in 1893. Most of his papers are to be found in the Transactions of the American Entomological Society of Philadelphia, and in this magazine.

He received the honorary degree of Doctor of Science from the Western University of Pennsylvania, and was the recipient of many distinctions from various Entomological Societies. Personally he was esteemed and beloved by all who knew him, and there are many who now deplore his loss. C. J. S. B.

JOHN A. BALKWILL.

Another death that it falls to our lot to record is that of our worthy friend, Mr. John A. Balkwill, Director for the London District, and for several years the efficient Treasurer of the Entomological Society of Ontario. After a few weeks of severe illness, he died at his residence in London on the 10th of October last, esteemed and respected by all who knew him. For a great many years he was an active member of the Society, and did a great deal to maintain the interest and enthusiasm of his colleagues in the study of Botany and Entomology and the use of the microscope. He was also particularly devoted to the cultivation of flowers, and became the first President of the local Horticultural Society, and continued a member of its directorate. In recognition of his valued assistance, Mr. C. S. Sargent, in his recent Monograph of the genus Cratægus in Ontario, named a new species, *Cratægus Balkwilli*, after him. It is a handsome tree found growing near London. C. J. S. B.

ENTOMOLOGICAL SOCIETY OF ONTARIO.

The forty-fifth annual meeting of the Society was held at the Ontario Agricultural College, Guelph, on Thursday and Friday, Nov. 5th and 6th. Owing to the lamented absence of the President, Dr. Fletcher, whose serious illness terminated in his death on the 8th inst, the chair was taken by the Vice President, Mr. T. D. Jarvis, during the day meetings, and by Dr. Bethune at the evening sessions: Amongst those present were: Rev. Dr. Fyles, Levis, P. Q.; Mr. Henry H. Lyman, Montreal; Prof. Lochhead, Macdonald College, Ste. Anne de Bellevue, P. Q.; Mr. Arthur Gibson, Central Experimental Farm, Ottawa; Mr. F. J. A. Morris, Trinity College School, Port Hope; Dr. Wm. Brodie, Mr. C. W. Nash and

Mr. J. B. Williams, Toronto; Mr. J. F. Calvert, Orangeville; Mr. J. H. Collingwood, Kintore; President Creelman, Professors Zavitz, Hutt and Bethune, Messrs. Jarvis, Eastham, Howitt, Hunt, Crow, Klinck, McMeans and a large number of the students of the Ontario Agricultural College and the Macdonald Institute, Guelph.

The proceedings began on Thursday afternoon with the reading of the reports of the Directors on the insects observed in their respective districts during the past season. This was followed by a conference on the chief insect pests of the year, during which the following were discussed: The Leaf Blister Mite *(Eriophyes pyri)*; Shot-hole Borer *(Scolytus rugulosus)*; Apple-maggot *(Rhagoletis pomonella)*; Lesser Apple-worm *(Enarmonia prunivora)*; Malformations of Apples and Pears Due to Insects; Oyster-shell Scale; San Jose Scale; Codling Moth; Tussock Moth; Turnip and Pea Aphis. The subjects were introduced for the most part by Mr. L. Caesar, and were discussed by Dr. Felt, Professors Lochhead and Bethune, Dr. Fyles, Mr. Nash and others. An interesting paper by Mr. Paul Hahn was read, being a report of what was being done in Toronto in order to control the ravages of the white-marked Tussock Moth.

In the evening, Dr. E. P. Felt, of Albany, who is State Entomologist of New York, gave a highly interesting and instructive address, illustrated by a series of excellent lantern pictures, on "The Interpretation of Nature." Professor Lochhead read a paper on the work of the Graduate School of Agriculture held at Cornell University, Ithaca, N. Y., in July last, and the chairman gave a brief account of the growth of the Society and what it had accomplished. The Massey Hall auditorium, in which the meeting was held, was well filled with students, both male and female, and many others. The College orchestra added much to the enjoyment of the evening by the musical selections that they rendered. A very hearty vote of thanks was given to Dr. Felt for his kindness in coming so far and affording so rich an intellectual and scientific treat.

During the second day, Friday, Nov. 6th, meetings were held morning, afternoon and evening in the Entomological Lecture-room, and were well attended by members and students. The reports of the Council, officers and branches of the Society were presented and read, and the following papers: "The Economic Importance and Food-habits of American Cecidomyiidæ," by Dr. Felt; "Observations on the Sorghum Midge in Louisiana," by Mr. R. C. Treherne; "Hydrœcia micacea in

Canada," by Mr. Arthur Gibson ; "Life-history of Euchætias Oregonensis," by Mr. H. H. Lyman ; "Natural Enemies of Some of the Ontario Coccidæ," by Mr. A. Eastham ; "Parasite Work on the Gypsy and Brown-tail Moths in Massachusetts," by Mr. W. R. Thompson ; "The Respiration of Caterpillars," by Mr. H. H. Lyman ; "Collecting with a Lantern Trap," and "Notes on the Occurrence of Lachnosterna in 1908," by Mr. J. D. Evans ; "Some Beetle-haunts, by an Amateur Botanist," by Mr. F. J. A. Morris ; "Insect Notes from Quebec Province," "What the Fruit-grower and Farmer Should Know About Entomology" and "The Strawberry Weevil," by Prof. Lochhead ; "Notes on Mites," by Mr. Jarvis ; "The Farmer's Wood-lot," by Dr. Fyles ; "Present Condition of the Work Connected with the Importation of the Foreign Parasites of the Gypsy Moth and the Brown-tail Moth," by Dr. L. O. Howard ; "Injurious Insects in Ontario in 1908," by Dr. Bethune. The proceedings, which were of a more interesting character than usual, were brought to a close at 10.30 p.m. by an informal address from President Creelman. A noteworthy feature of the meeting was the presentation of excellent papers by three of the senior students of the College. The whole of the papers read will be published in full in the forthcoming Annual Report of the Society.

The election of officers for the ensuing year resulted as follows :

President—James Fletcher, LL.D., F.R.S.C., F.L.S., Entomologist and Botanist of the Experimental Farms, Ottawa.

First Vice-President—Tennyson D. Jarvis, B.S.A., Lecturer in Entomology and Zoology, Ontario Agricultural College, Guelph.

Second Vice-Fresident—Dr. E. M. Walker, University of Toronto.

Secretary-Treasurer—J. Eaton Howitt, B.S.A., Demonstrator in Botany, O. A. College, Guelph.

Curator—Lawson Caesar, B.A., B.S.A., Demonstrator in Entomology and Plant Diseases, O. A. College, Guelph.

Librarian—Rev. C. J. S. Bethune, M.A., D.C.L., F.R S.C., Professor of Entomology and Zoology, O. A. College, Guelph.

Directors—Division No. 1, Arthur Gibson, Department of Entomology, Central Experimental Farm, Ottawa ; Division No. 2, C. E. Grant, Orillia ; Division No. 3, J. B. Williams, Toronto ; Division No. 4, C. W. Nash, Toronto ; Division No. 6, R. S. Hamilton, Collegiate Institute, Galt.

Auditors—Professor McCready and J. Crow, B.S A., O. A. College.

Delegate to the Royal Society—Arthur Gibson, Ottawa,

"SOME BEETLE-HAUNTS," BY AN AMATEUR BOTANIST.*

In my four seasons of collecting as a coleopterist there have been three collecting grounds that have most attracted me : (a) Stumps and tree-trunks ; (b) blossoms ; (c) foliage. In all three I have found a considerable range of beetle-guests, and am able to record rare or interesting finds. It is probably in the second of these three haunts that I have had most success, but it is with the first that I intend chiefly to deal in this paper.

There are two conditions under which stumps make a good collecting-ground ; one is when they are dead and dry, but have the bark still covering them ; it was this condition that first drew my attention and held it through my first season as a collector. The other condition is when there is yet some life in the wood, so that the top of the stump bleeds. I have found that stumps ooze sap in this way for several seasons after the tree has been cut down. A good way to catch beetle-visitors is to scatter some good-sized chips or lay a slat or two of wood or bark on the top. Most beetles are active at night, and when there is a shelter of this sort, they take cover there instead of flying away when the sun rises. Easily the best tree for its range of beetle-visitors, as well as for total quantity, I have found the basswood ; next to that the white pine ; then the maple, the birch and the elm. Often when a stump is dry and apparently not in a condition to attract guests, it may be made inviting if the bark is still partly green. I have often pried up the bark with a chisel, and laid the strips thus removed on the top of the stump ; the smell of the sap or juice fermenting has generally lured some prizes to this bait and trap combined.

The season for collecting in this way may be said roughly to extend from the beginning of May to the middle of July. I began collecting in the spring of 1905, but as I went to England at the end of June I did not make much headway that season. In 1906, however, I did a great deal of collecting and gained quite a lot of experience. One of my first finds was at the beginning of June, while prying the bark from a basswood stump ; I discovered something like a dozen specimens of *Saperda vestita*, newly hatched and buried in the inner bark of the tree. I had my killing-bottle with me, but as the insects were still soft I put them into a small tin box. Here they crawled about excitedly, squeaking (or, rather, stridulating) when handled. On examining them after my return home, I found they had fought in the box, two of them had their antennæ nipped off and several had been deprived of their full complement of legs. I had not yet learned the advantage of laying the detached bits of bark on the stumps as shelter for nocturnal visitors, and so missed a golden opportunity. However, there were a number of basswood stumps in the clearing where I made my first capture, and from these I got several more specimens.

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*Read at the Annual Meeting of the Entomological Society of Ontario, Nov. 6, 1908.

About the last day of June in the same season, while struggling from a tamarack swamp in which I had found a rare fern (*Botrychium simplex*), I noticed a fallen and decaying trunk of elm, and on removing some bark found it infested with a larva closely resembling that of *Saperda vestita;* I took one that appeared nearly full-grown, with some of the rotton inner bark, and succeeded in rearing it ; some three weeks later it emerged from the pupa as the elm-borer (*Saperda tridentata*). I have taken only one other specimen of this beetle ; it settled one fine Sunday night in June on a supper-table at which I sat, a guest ; the entomologist, however, would not be denied, and in spite of looks of outraged propriety on the part of my fellow-guests, and some embarrassment (not mine, but my hostess's), I produced a cyanide bottle and captured the insect.

Early in July I went to Oliver's Ferry on the Rideau, and in a day or two chanced upon a spot that proved a regular treasure-house to the young collector ; it was at the side of a path through a wood of young growth, mostly basswood and maple ; here lay a log of basswood with the bark still on it, close by the stump from which it had been cut, and a pile of basswood split and stacked. In the bark of the stump and the log I found larvæ and pupæ of the *Saperda vestita;* some pupæ that I took home lived, and from two or three I secured specimens of the imago. In the hot sunshine beetles lit on the log and on the wood-pile, and I tried the experiment of laying detached pieces of bark on the stump, the log and the split wood, sometimes sandwiching bits of bark between sticks of the wood-pile. This simple contrivance of bait and trap yielded splendid results for over a week, at the end of which time the bait was filched by the sun drying all the moisture out. My captures comprised an *Elater* as large as *Alaus oculatus*, and dark pitchy-brown in colour ;

two specimens of a *Chalcophora*, three or four of *Dicerca divaricata*, and 15 of a *Chrysobothris*, about the size of the apple-borer (*Ch. femorata*) ; a dozen or more of a blackish weevil, akin to the strawberry weevil ; some two dozen specimens of *Eupsalis minuta*, sexes evenly divided ; 25 specimens of *Parandra brunnea*, one specimen of *Tragosoma Harrisii*, and a beautiful specimen of the little *Amphionycha flammata*. This last, Dr. Bethune tells me, has seldom, if ever, been reported from Ontario, and it may therefore be interesting to some of you to know that I captured a second specimen of the same beetle about three days later, sunning itself on a leaf of basswood, within 50 yards of the first capture. It was a bright, calm day in July when I captured the first, and very hot, with the sun almost at its zenith, and the log on which the insect lit was bathed in sunshine ; small as the creature is, the sharp click with which it settled was distinctly audible. As the basswood pile was beginning to fail me, I happened on a clearing where some small maples had been felled. Finding the stumps still moist, I laid chips and bark about their tops ; this yielded me several new species, a beetle marked like the *Megalodachne*, but smaller and with the ground colour light brown instead of dark chestnut ; three or four specimens of a beetle allied to the weevils, I think one of the *Anthribidæ;* and, settling on a stump in the sunshine, a magnificent specimen of *Purpuricenus humeralis*, a longicorn of great beauty.

At the end of August I was out fern-hunting at Lake Dalhousie, about 20 miles north of Perth. From a stump of white pine I took the pupa of a longicorn, which later emerged as *Rhagium lineatum*, and while raising some chips from the top of a fresh and resiny stump of white pine I drove from cover a *Clerid* that was then new to me ; the head and thorax were dull orange, the base of the elytra the same, the rest of the elytra was alternate gray-white and black. Up to that time I had only found two species, a small scarlet one, fairly common under bark, and one banded with orange and dark blue, which is frequent on certain blossoms. Early next spring, about April the 28th, I found some white pine had been felled in the winter, not many miles from the school in Port Hope. Recollecting my find of the previous autumn, and thinking the fresh resin might be the attraction, I laid some bits of bark and chips on the surface of the stumps. On visiting my traps a day or two later I was agreeably surprised to find three specimens of the resin-loving *Clerid*. About the same time I got five more specimens from newly-felled pine, under the chips that had been left on the stump by the axe. Some of these stumps I baited with chips, and in all captured about a dozen. I have never found them on dry stumps, but only under fresh chips and associated with new resin. The creature closely resembles a beetle figured by Curtis in his British Entomology as *Thanasimus formicarius;* it is there said to frequent the Scotch fir, which, of course, is also a pine.

About the middle of May in the same season (1907) I visited the basswood stumps from which the year before I had got the *Saperda vestita.* Some of the bark that I pried up was infested with *Leptura ruficollis*, and I took also from under the bark two pupæ of a longicorn closely allied to *Urographis.* Ripping some bark from the sides of several stumps, I laid it on the tops. This proved an admirable bait, and among my captures were three or four specimens of a tiger-beetle (*Cicindela sexguttata*), seven specimens of a rove-beetle (*Staphylinus violaceus*), 12 or 14 of the northern *Brenthid* (*Eupsalis minuta*), a single specimen of a locally rare darkling beetle (*Phellopsis obcordata*), five *Penthes* and six or eight *Alaus oculatus;* I may say that I have found the species *oculatus* very common on the basswood, and in one or two cases the beetle, under concealment of the strip of bark, had, during part of the night, half buried itself in the wood of the stump. The beetle can eat very fast; a friend of mine took nine or ten from a rotten basswood log and sent them to me in a stout cardboard box; when I got the parcel one of the largest specimens had eaten a hole through the corner of the box and was through two folds of the brown-paper wrapper. I have never found the allied species of *myops* on basswood, but always in white pine, usually under the bark of dead dry stumps, where it is fairly abundant.

Later on in the same season, while wandering about the upper reaches of Gage's Creek, about six miles from the school, I passed through a clearing in which hemlock had been felled; among several other *Buprestids* settling on the bark of prostrate logs as well as standing trees, were two that were new to me, both very active, and only to be caught (unless you had a net) by careful stalking; one a small *Chrysobothris*, and the other, *Melanophila Drummondi;* this last I had never seen before and have never seen since, but on this newly-felled hemlock, as well as on living trees, it was abundant, and I captured about a dozen specimens; a few days later, at the end of June, I took to the clearing a brother-collector anxious to see *Melanophila Drummondi* in its native haunt, and there I turned him loose. While I was looking about, with my eye focussed for beetles, I distinctly saw a pair of longicorns running on the trunk of a tall elm growing at the foot of the clearing near the stream. From their movements and appearance both I felt sure they were longicorns, and at first took them for a pair of *Cyrtophorus verrucosus*, a beetle I am well acquainted with; an instant's reflection told me that at ten yards' distance a beetle the size of *Cyrtophorus* would hardly be visible, and I rushed towards what I was certain must be a prize; unfortunately, the beetles were running in an upward spiral, and when I stumbled to the tree over a rotten log they were almost out of reach; I jumped and managed to brush one to the ground, but could not see it by the most careful search; however, I waited patiently for a minute or so, and then, to my great delight, saw the creature emerge from the ground and reascend the trunk. As I captured it I recognized in it the *Physocnemum brevilineum*, a long-coveted species. Scanning the tree carefully, I presently descried two more of the beetles running about on the bark, some 20 feet up; I stayed for nearly an hour at the foot of the tree, with hope in my heart and a crick in the neck, as intent as a dog listening to the chatter of a squirrel, and my reward was three or four specimens of the beetle. As a rule, they appeared from a height beyond range on the trunk of the tree, walking rapidly downwards, following the corrugations and grooves of the bark; occasionally, however, they lit on the tree after flight through the air, but they rarely when disturbed took to the wing for escape, preferring to run or to release their hold and drop. A six-mile walk is nothing when a new longicorn is waiting just round the last corner, and I made the tree the turning-post of my daily course for nearly a week, by which time I had taken 15 or 16 specimens. The tree was apparently sound, with a magnificent crown of foliage surmounting the massive pillar of its trunk, but the beetle was breeding there, I am pretty sure, and in July of this year, while I was in England, my fellow-collector got several more specimens on the same tree.

Early in July I made an expedition to Garden Hill, some 10 miles north of Port Hope; here they were cutting out the pine from a 20-acre lot, and a sawmill was at work. I went out in hopes of getting some specimens of *Monohammus*, a beetle that, with a single exception, I knew only from cabinet collections. The lumbermen said they had seen numbers of these insects on the logs and in the brushwood, but from inexperience or ill-luck I failed to secure many; my bag included one pair of the large gray *Monohammus*, three isolated specimens of *Monohammus scutellatus*, and one specimen of a third species of *Monohammus*, the elytra being in colour a mottle of three or four shades of rust-yellow, and the insect in size almost identical with *scutellatus*. By preparing several stumps and logs with chips and stripping the bark from dead trees, I got several other longicorn beetles, such as *Criocephalus agrestis*, *Orthosoma brunneum*, *Tragosoma Harrisii*, and a carcase of *Prionus laticollis*. Had this been all, I should have felt some disappointment, but it wasn't. The place was a veritable paradise of *Buprestids*, and not only did I get 12 or 14 species in all, but among them several quite new to me, beginner as I was. There were at least two (probably three) species of *Chrysobothris*, two of *Chalcophora*, three or four of *Dicerca*, two or three of *Buprestis*, and a black *Melanophila* with a nasty bad habit of settling on the back of one's neck and giving it a sharp nip.

There could be nothing more enjoyable than roaming about in that clearing, and though it is nearly a year and a half ago, it seems like yesterday. It was glorious July weather; in the distance you could hear the mourning dove, and round about in the brushwood and trees were several pairs of Towhees and not a few slate-coloured Juncoes. While ranging up and down I noticed on a bare dead trunk of pine a bright looking beetle with apparently a damaged wing, for it stood out from the creature's body at an angle. At nearer view this resolved itself into a brand-new *Clerid*, the largest I had ever seen, and in its jaws was the elytron of an *Elater*, off which the monster had just been dining; no midnight assassin, but a cannibal in broad daylight, and the rascal was flaunting his trade in one of the gayest liveries you ever saw; the head and thorax were orange, the shoulders (or base of elytra) black, round the waist a broad sash of brilliant scarlet, below that another band of black, then a band of gray-white, and the tips of the elytra black. In two all-day visits to this place I caught five of these beetles, three of them red-handed; one on a stump with an ant in its jaws, a third on a fence-post dissecting a grub of some kind; the other two belonged to the blameless order of those that have not yet been found out; one was resting on a rail, along which a stream of ants happened to be crawling, and the fifth was just issuing from an ant-bore in a dead pine, down which motives of curiosity, doubtless as innocent as idle, had prompted it; the same impulse, I think, rather than any misgivings about my intentions, caused it to disappear down an adjoining tunnel, whence my forceps finally extracted it.

In the season just over (1908) I noticed some felled maple and birch on a hill-side seven miles from Port Hope. At the beginning of June I laid chips about two or three of the stump-heads ; on the fallen trunks I found an immense number of a *Chrysobothris* breeding, while under two of my chips on the maple I took two pair of *Urographis fasciata*, and resting on a stump near by I captured a *Leptura biforis*.

About the middle of June my attention was drawn to some white pine felled in the winter among some woodlands known locally as Pine Grove. There were about eight trees in all, lying on the ground within a space of about a mile ; on the trunks and branches were crawling a number of small dark *Clerids*, with a mark of crimson and two marks of white on each elytron ; there were also two sorts of weevil abundant under chips of wood on the ground, and many *Buprestids* visiting the logs; but, in special, on the trunks, limbs and larger branches there were *Monohammi* breeding; in about six visits I took well over 100 specimens, and my fellow collector continued to find longicorns up to the 20th of July or later; our combined captures would amount to 250 beetles. The great majority of these were *Monohammus scutellatus*, of which I took 100, mostly in pairs ; I took besides eight or ten specimens of the large gray *Monohammus* (whether *titillator* or *confusor*, I am not sure), and four of both sexes of the rust-yellow species ; we also got several specimens of a stout gray beetle resembling *Urographis*, but without the extended ovipositor, and a few of a gray species of delicate structure and extremely fine antennæ (perhaps *Liopus*) ; about the middle of July my friend took some 12 specimens of *Leptostylus parvus*. All this on some 10 trunks of newly-felled pine.

Our experience raises a question as to the length of time required by the larvæ to mature. There was a tree among these others that had been blown down early in 1907, and was thus in its second season ; it was full of holes, most of them quite fresh, from which mature insects had escaped; we could hear larvæ at work during June inside the log : but we did not see any beetles breeding or laying eggs on the bark, as they were doing on all the fresh-fallen trees. Unfortunately, most of these trees have since been removed. I am inclined to think that the drier the wood is, the longer the larva takes to reach its full growth, and that if the larva hatches in fresh wood it can mature in a single season ; I should think this was true of the *scutellatus* anyway, even if *confusor* and *titillatus* require longer. The well-known stories, most of them authentic, about the mature insect escaping from tables and chair-legs several years after the manufacture of these articles, would thus illustrate an exceptional state of things in which the larva was confronted prematurely with dry wood to feed on.

Besides these captures on stumps and logs, I have made several by using a similar trap, with fungus substituted for bark. But at present I shall content myself in my closing paragraphs with a few general remarks on the subject of blossoms, as a collecting ground for beetles.

If you refer to any handbook of North American flora, you will find about 130 natural orders of flowering plants. The vast majority of these, however, do not offer their sweets (or pollen, rather) to those browsing cattle among insects, the beetles, whose short jaws and general habits incline them to visit only small shallow blossoms growing in close clusters (racemes) or in flat bunches or heads. Nearly all the blossoms that form a favourite haunt for beetles are included in the series between order 25 and order 50, beginning with the sumach and the vine and ending with the composites. The only important beetle-food outside that series, in my experience, is the milkweed and its ally, the dogbane, which come about No. 70 in the natural orders.

If you look a little more closely at the series from 25 to 50, you will find these fall into two distinct groups of eight, separated from each other by a wall of ten consecutive orders unattractive to beetles.

The first group extends from the poison ivy and the grapevine through the New Jersey tea and the spiked maple to the great rose family. Of these, the milkwort and the vetch, from the form of their blossom, are valueless; the poison ivy and the grapevine are fairly good, but the range of their guests is limited. The New Jersey tea is a plant with hardly a rival, both for range of species and for total number of insects. The spiked maple is also a rich storehouse of beetles. In the rose family I have found the hawthorn best, next to it the rose and the bramble, and then the spireæa and the chokecherry.

The second group of eight begins with the umbellifers, and passing through the dogwood and the elder, closes with the great composite family. Of these, the bedstraw, valerian and teasel are comparatively worthless; but the dogwood is an excellent host, and so are the two species of elder, while several of the composites are worth careful scrutiny.

I shall carry this principle of selection a little further, by giving a rough outline of a season's beetle-collecting from blossoms. The first blossom to open is the early or red-berried elder *(Sambucus pubens)*; it varies considerably from season to season, as well as in any one season, owing to differences of location; but about the 10th of May it will be found flowering, and its season may last for ten days; it is immediately followed by the hawthorn, which lasts till perhaps the 10th of June; by this time the spiked maple and the dogwoods are in flower, and before this last is over comes a riot of blossom; for the late elder and the New Jersey tea, both open in the last days of June.

These blossom haunts, then, extend from early in May till the middle of July. The only other conditions of time that need be mentioned are that the pollen on a given blossom must be in a certain state of ripeness or it does not appear to attract beetles at all, and as a rule the sun must be shining on the blossoms; if it is hot and calm besides, then you have ideal conditions.

There is, however, an important condition of space to add to these of time. I have, as a beginner, spent hours in fruitless search over whole hedges and thickets of elder and bushes of hawthorn, when ten minutes at a single shrub, with only a few meagre blossoms on it, would yield a rich harvest. Why? Because the flowers must be growing near a thicket or a wood; if they are in the open, even a hundred yards or so from timber lands, they are almost useless. This is particularly the case when it is longicorns you are on the lookout for. It is, of course, well known to Coleopterists of experience that a clearing or the border of a wood is the best locality; it is remarked again and again by Bates, in his travels on the Amazon, and it is pointed out by Rye and Fowler, in their hints to collectors in Great Britain.

In closing, I should like to say that by no means the least pleasure to a lover of nature is to observe the marvellous constancy with which season after season these tiny creatures, the offspring of a last year's brood, return to their ancestral haunt, be it blossom or leaf, true to the clock of the year almost to a day; in obedience to a law there is no gainsaying, and which yet in the creature's serene unconsciousness seems robbed of any touch of harsh compulsion.—F. J. A. MORRIS, Trinity College School, Port Hope, Ont.

A KEY TO THE NORTH AMERICAN SPECIES OF AESHNA FOUND NORTH OF MEXICO.

BY E. M. WALKER, TORONTO.

(Continued from page 391.)

The following notes are intended merely to give a general idea of the distribution, as far as known, of the species of Aeshna treated in the key. Detailed lists of localities, references, etc., will appear in the revision :

1. *Aeshna Californica.*—A Pacific Coast species, ranging from Lower California northward into southern British Columbia.

2. *Ae. multicolor.*—This species ranges from Panama through Mexico, and the United States west of Texas and Colorado to southern British Columbia.

3. *Ae. mutata.*—Thus far known only from Indiana and Massachusetts. I have also seen a female from Stewart's Lake, Kent, Ohio.

4. *Ae. palmata.*—This species ranges from Kamtchatka through Alaska and British Columbia to Colorado, Utah and Lower California.

The Lower Californian specimens differ in some degree from the others seen, but are probably not even racially distinct. This species and the following have been generally recorded as *A. constricta.*

5. *Ae. umbrosa ("Ae. Z.,"* Williamson).—One of the most abundant and widely-distributed species, occurring in a broad belt from the Atlantic to the Pacific in the Upper Austral, Transition and Canadian Zones.

Western specimens approach *Ae. palmata* in the more robust abdomen, larger size of PD and a few other details of coloration, but are otherwise typical.

6. *Ae. constricta.*—Transition and Upper Austral Zones from the Atlantic Coast to the Dakotas and southern Manitoba.

7. *Ae. interrupta* (*"Ae. W.,"* Williamson).—Boreal Zone, occasionally appearing in the Transition Zone, from Newfoundland, through Quebec, Northern New England and New York to North-western Ontario and Northern Michigan.

It is very closely allied to the next three forms.

8. *Ae. interna*—A mountain species, ranging from southern British Columbia to California and New Mexico.

9. *Ae. lineata.*—A species characteristic of the Canadian prairies. It ranges from Manitoba and North Dakota to the Rocky Mountains, and thence northward to Great Slave Lake. It is the common species in Manitoba and Saskatchewan.

10. *Ae. Nevadensis.*—A series of eight males from Reno, Nevada, are the only specimens seen.

The characters by which *Ae. interna*, *lineata* and *Nevadensis* are separated are so slight that it is by no means improbable that intermediate forms may be found. The first two named forms, however, are certainly characteristic of different geographical provinces, and although a considerable series of both has been examined, no intergrades have been seen. There seems to be no constant character for the separation of the females.

11. *Ae. eremita* ("*Ae. X.*," Williamson).—A very distinct species belonging to the wooded parts of the Boreal Zone from Labrador, Newfoundland and the White Mountains to the Hudson's Bay Slope, Great Slave Lake and Alaska, thence southward in the Rocky Mountains to Wyoming. It occasionally wanders into the Transition Zone.

12. *Ae. clepsydra.*—Upper Austral and Transition Zones, from New England to Ontario and Indiana.

13. *Ae. Canadensis* ("*Ae. Y.*," Williamson).—Next to *Ae. umbrosa* this is the commonest *Aeshna* in collections, and is generally known as *Ae. clepsydra.* It is an abundant species in the Canadian division of the Boreal Zone, and is also common in the Transition Zone, from New England and the Maritime Provinces to Manitoba. Typical examples from Washington Territory have also been examined, and its range is therefore probably continuous from Atlantic to Pacific.

14. *Ae. verticalis.*—Very closely allied to *Ae. Canadensis*, but undoubtedly distinct. It inhabits the Transition and Upper Austral Zones east of the Mississippi.

15. *Ae. tuberculifera.*—A somewhat rare species, very distinct from any of the others. It has been taken in some numbers in the New England States, especially in southern Maine, and a few specimens from Ontario and Wisconsin have also been examined.

16. *Ae. juncea.*—A circumpolar species found in America in the sub-arctic forest belt, from Newfoundland to Alaska and south to the White Mountains, northern Ontario and in the Rocky Mountains to southern Colorado.

17. *Ae. subarctica.*—Boreal Zone, from Anticosti and Nova Scotia to Isle Royale, Mich., and the north shore of Lake Superior.

18. *Ae. sitchensis.*—Boreal Zone, from Newfoundland, through Quebec, northern Ontario, northern Michigan and Minnesota to Alaska.

19. *Ae. septentrionalis.*—Hudsonian division of the Boreal Zone, from Labrador, Newfoundland and the White Mountains to Great Slave Lake.

TWO NEW GENERA OF ORIENTAL HEMIPTERA.

BY G. W. KIRKALDY, HONOLULU, HAWAIIAN ISLANDS.

TESSAROMERUS, gen. nov.

This genus belongs to the Urolabididæ, and differs from all the described genera by having only four segments to the antennæ, the fourth being longer than the third, which is subequal to the second and longer than the first. The labium extends about as far as the base of the middle ambulacra. Lateral margins of pronotum sinuate and a little reflexed. Some of the veins of the membrane are incompletely furcate. Otherwise it is very much like Urochela.

(1) *quadriarticulatus*, sp. nov.—Brownish-yellow, punctured with blackish, a small lævigate pale yellowish spot on each side of the middle of the pronotum. Antennæ blackish.

Length, 9½ mill.

Hab.: China, Yunnan (Montandon, in my collection).

RHEUMATOTRECHUS, gen. nov.

This genus has somewhat the appearance of *Ptilomera* of the Gerridæ, but the legs are much shorter, especially the fore tarsi.

Head as in *Ptilomera*, but the eyes are less oblique, and much less emarginate, the vertex being elongate, and subparallel as far as the articulation of the antennæ. The first segment of the antennæ is little longer than the second. The labium is much as in *Ptilomera*. In the apterous form the pronotum is well rounded at the sides, extending laterally much farther than the eyes. The nota and tergites are much as in *Ptilomera*, but the whole insect is much shorter and broader in proportion, the abdominal sclerites much less elongate, the mesonotum also more rounded laterally. The fore femora are a little incrassate, and are scarcely longer than the tibiæ ; fore tarsi very short. Middle and hind legs much shorter than in *Ptilomera*.

(1) *Himalayanus*, sp. nov.—Pale castaneous or fulvous ; head with an elongate oval mark on vertex (the interior castaneous) and some lateral marks, dark fuscous. Apex of first segment and apical fourth of second dark fuscous. Eyes dark. Last segment of labium black. Pronotum dark castaneous ; a central line and a lateral sinuous one on each side, yellow, the central one narrowly and rather obscurely margined with black, this spreading out a little apically. The mesonotum has a small, subtriangular, fuscous mark on each side subanteriorly. Legs yellowish-fulvous;

apex of tibiæ and the tarsi blackish. Tergites dark castaneous, verging on piceous on abdomen proper and inward half of pleurites; one or two smaller brown spots medially. Beneath yellowish-fulvous, a lateral, sinuous, dark castaneous line on the mesosternum on each side, edged with silver; also some obscure marks. The first segment of the antennæ one-fifth longer than the second. Fore femora scarcely longer than the tibiæ, which are nearly four times as long as the tarsi; last tarsal segment more than twice as long as the penultimate. Middle femora slender, as long as body from base of clypeus to base of pygophor; scarcely longer than tibiæ and tarsi together; tibiæ about twice and a half as long as the tarsi, first tarsal segment twice as long as the second. Hind femora one-third longer than the middle pair; scarcely longer than the tibiæ and tarsi; tibiæ slightly more than twice as long as the tarsi; first tarsal segment not twice as long as the second. The hind part of the metanotum is triangular, the sides shortly truncate, and the base a little emarginate.

♂.—The pygophor is very remarkable, and I hope to figure it in my forthcoming "Notes on the Gerridæ"; the hooks, etc., are yellowish-fulvous, the apices blackish.

Length, 8 mill.

Hab.: India, Kurseong (which I believe is near Darjiling, and is also called "Karsiang"), in coll. Belgium Mus.

This genus has considerable general resemblance to *Chimarrhometra orientalis* (Distant). It is true that Mr. Distant places the latter in the "Halobataria," and indeed originally described the species as *Halobates!* but the emargination of the eyes he might have overlooked. The antennal proportions are, however, quite different, as also those of the labium. It may also be remarked that Mr. Distant has described the labium *(rostrum)* as being composed of five segments!!—a condition unparalleled in Hemiptera; in fact, practically impossible. On referring to the original figure, it is seen that Mr. Distant has mistaken the extruded end of the setæ for a fifth segment!! Mr. Distant cites Bianchi as the authority for the statement that *Chimarrhometra* is a fresh-water Himalayan genus, whereas Bianchi had not seen a specimen of the genus he described, the particulars being taken entirely from those of Mr. Distant. The genus is evidently semiaquatic, and as there is presumably no sea-water in Jhelam Valley, it must necessarily be a fresh-water genus!

It is evident that Mr. Distant's descriptions and figures are quite untrustworthy, and we must await further captures of this interesting form.

A NEW GENUS AND SPECIES OF BLENNOCAMPINÆ FROM TEXAS.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

The following species was received from Dr. L. O. Howard, of the U. S. Department of Agriculture, for identification. It was found after careful study to represent an undescribed genus. This genus would fall in the tables next to *Phymatocera*, Dahlb., from which it is readily separated by having the antennæ strongly serrate on one side, the posterior metatarsus as long as all the following segments together, and the posterior tarsi shorter than the posterior tibiæ.

CERATULUS, n. gen.—Antennæ with nine segments, all the segments except the first, second and ninth strongly produced on one side at apex, the first segment large and globular, the second segment small, broader than long, the third segment short, about twice as long as broad at apex, the fourth segment twice as long as the third, the fifth shorter than the fourth and longer than the third ; malar space narrow, hardly more than a line ; legs with the front and middle tarsi longer than the tibiæ, the posterior tarsi shorter than the tibiæ ; the posterior metatarsus as long as all the following segments together ; the claws cleft ; the front wings with the radial and the radio-medial cross-veins present, the medio-cubital cross-vein parallel with the free part of M_3+_4, the anal cell petiolate, the radial cross-vein and the free part of R_4 inclined at the same angle, and the free part of M_4+Cu_1 slightly nearer the medio-cubital cross-vein than the free part of M_3+_4 ; the hind wings with the free part of M_2 present, the first anal cell slightly petiolate at apex. Type *Ceratulus spectabilis*, MacG.

Ceratulus spectabilis, n. sp.—♂ and ♀. Body rufous or reddish, with the antennæ, the tips of the mandibles, the sutures around the ocelli, the legs beyond the apical fifth of the femora, and the saw-guides, black ; the wings strongly infuscated, the veins and the stigma black ; the labrum broadly rounded, the clypeus truncate ; the antennal furrows extending to a large circular excavation above the bases of the antennæ, interrupted on the middle of the front, and continued from opposite the lateral ocelli as narrow, line-like furrows to the occiput ; the antennal fovea broad, bounded below by a distinct ridge, the lateral walls of the fovea continued to the ocelli, where they form prominent ridges between the median and lateral ocelli, the lateral ocelli being placed on the sides of the ridges and therefore facing out ; the postocular area not bounded in front by a furrow, and with a more or less distinct median groove; head and thorax covered with a fine, almost colourless pile; the saw-guides straight on the upper margin, and gradually, obliquely, convexly rounded to a blunt point at apex above. Length, 9 mm.

Described from a number of individuals received from Dr. L. O. Howard and Mr. W. D. Hunter, bred from larvæ collected on *Cissus incisa* by Mr. E. S. Tucker at Dallas, Texas. Hunter, No. 1619. Type and paratypes in the collection of the U. S. Department of Agriculture, and paratypes in the Entomological collections of Cornell University.

ENTOMOLOGICAL SOCIETY OF ONTARIO.

The first regular meeting for the season of the Entomological Society of Ontario was held at Guelph on Wednesday evening, November 18th, 1908; the following resolution was unanimously adopted:

"The members of the Entomological Society of Ontario have heard with profound regret of the death of their esteemed and beloved President, Dr. James Fletcher. They one and all feel that they have lost a personal friend whose place in their affection and regard can never be filled, and that the Science of Entomology in Canada has been deprived of its leader and most able exponent. Those who have had the privilege of knowing Dr. Fletcher must share our grief, and will, with us, treasure in their hearts a grateful recollection of his unbounded kindness and geniality, his generous assistance freely given to all who applied to him, and the enthusiasm in the study of nature which he everywhere inspired.

"On behalf of the Society, in which he took so active an interest during a great many years, we beg to offer to Mrs. Fletcher and her daughters this expression of sympathy with them in their sore bereavement, and to assure them that their grief is shared by a large circle of friends in all parts of the country."

The following papers were read:

The Classification of the Muscoidean Flies, by Mr. W. R. Thompson.

Rearing Pomace Flies (Drosophilidæ), by Mr. E. Stafford.

The former paper, which was illustrated with diagrams and figures on the blackboard, furnished a general classification of the superfamily, and then dealt more particularly with the parasitic Tachinidæ. The latter paper gave the results of some careful observations made on the life-history of these minute Dipterous Flies which are to be found in cider mills and other places where there is fermenting vegetable matter. Both writers, who are Fourth-year students in the Ontario Agricultural College, were complimented on the excellence of their papers and the careful scientific work which they had performed.

Owing to the lamented death of Dr. Fletcher, the following officers were elected:

President—Tennyson D. Jarvis, B. S. A., Lecturer in Entomology and Zoology, Ontario Agricultural College, Guelph.

Vice-President—E. M. Walker, M. D., Lecturer in the Biological Department of the University of Toronto.

MONTREAL BRANCH.

At the monthly meeting of the Montreal Branch, held at 850 St. Hubert Street, on Saturday evening, November 14th, the following resolution was passed:

Moved by Henry H. Lyman, seconded by A. F. Winn, and resolved:

That the members of the Montreal Branch of the Entomological Society of Ontario, having learned with unfeigned sorrow of the untimely death of Dr. James Fletcher, President of the Parent Society, and Entomologist and Botanist of the Dominion Experimental Farms, desire to place on record their high appreciation of his eminence in his field of labour, and of his lovable personalty. They feel that in his death the Society and Entomological Science in Canada have sustained a great loss, and desire to assure his widow and family of their sincere sympathy in their great bereavement.

That copies of this resolution be forwarded to Mrs. Fletcher, to the Parent Society and to the daily press.

NEPYTIA PELLUCIDARIA, Pack.—Since my notes on this species were written (CAN. ENT., Vol. XXXIX, p. 171) I have been permitted to examine the types of Geometridæ described by Dr. Herman Strecker at Reading, Penn. My conjecture, that his *Cleora fumosaria* is the same as this species, proves correct, and it must hereafter be listed as a synonym of *pellucidaria*, Pack.—RICHARD F. PEARSALL, Brooklyn, N. Y.

"MEIGEN'S FIRST PAPER ON DIPTERA."

BY D. W. COQUILLETT, WASHINGTON, D. C.

In attempting to settle the status of names affecting the nomenclature of any class of animals or plants, unless this is done in an impartial manner the reader will be unable to form an unbiased opinion from the statements set forth. The present remarks are called forth by a perusal of the article under the above caption, which appeared in the CANADIAN ENTOMOLOGIST for October, pages 370 to 373.

No student who has seen Meigen's paper of 1800, or Mr. Hendel's reproduction of it, can truthfully say that the author has not complied with the rules adopted by the International Zoological Congress. There is, first, the name of the proposed new genus in proper Latin form, then a description of the genus, followed by a statement of the number of species known to the author as belonging to the genus. The author, therefore, had a correct idea of binomial nomenclature, and, so far as he went, he applied it in this paper. That a genus can be founded without being accompanied by the name of any species, is allowable under Article 2 of the International Code, which holds that "The scientific designation of animals is uninominal for subgenera and all higher groups." It has not infrequently happened that an author has founded a genus in one number of some journal without any mention of species, but has treated the species in a subsequent number, and students have almost universally taken the first date as the real date of the genus, a view held to be correct by the Code. The case of Meigen's generic names is similar to this, the difference being that before treating of the species (in 1804) he published a second paper on genera (1803), changing several of the names given in his previous (1800) paper. In a few cases such changes were allowable on the score of preoccupation, but in the other instances the changes were unjustified, and therefore the old names must be restored under Article 25 of the Code—the well-known law of priority.

As to the contention that these old genera of Meigen are invalid on the score of having no type species, Rule 7 under Article 30 of the Code covers this point: "In case a generic name without designated type is proposed as a substitute for another generic name, with or without type, the type of either, when established, becomes *ipso facto* the type of the other." On this principle, the type species of any one of Meigen's genera of 1803 is the type of his corresponding genus of 1800. Among the generic names of 1803, no less than twenty were also unaccompanied by the name of a species, yet these very generic names, with few exceptions, are now in current use.

That Meigen's names are *nomina nuda*, as has been claimed, is clearly erroneous; each is accompanied by a description, which effectually removes them from this class of names.

Nor have these names been entirely neglected since they were first published in 1800. Latreille, in his "Histoire Naturelle des Crustacés et des Insectes," Vol. III, published only two years after Meigen's paper first appeared, used several of them as subgenera, and in giving a resume of Latreille's classification, Meigen himself connected most of them with his 1803 names (see his "Klassifikazion und Beschreibung der europäischen zweiflügligen Insekten," 1804, pages xv–xxiii).

Article 32 of the Code holds that "A generic or a specific name once published cannot be rejected, even by its author, because of inappropriateness." There is, therefore, no escaping the using of such of these names as are not synonyms or homonyms.

There are, and always have been, obstructionists in almost every field of science. Osten Sacken refused to use the old generic names of Rondani in the Cecidomyiidæ, and Grote steadfastly rejected those proposed by Hübner in his "Tentamen"; yet both of these classes of names have since come into general use. Our individual preferences amount to but little; what the rank and file of the students of this and of future generations are going to do in the matter of nomenclature is all-important, and any effort to prevent others from following well-recognized rules and scientific usages cannot, by any method of reasoning, be regarded as being in the best interest of science.

SOME NOTES ON METAPELMA SPECTABILIS, WESTW.

BY CYRUS R. CROSBY, CORNELL UNIVERSITY, ITHACA, N. Y.

On August 12, 1907, I captured a male of this species on the window of the Insectary at Cornell University. While it agreed fairly well with Westwood's concise description given in Proc. Zool. Soc., Lond., III, p. 69, 1835, and in his Thesaurus Entomologicus Oxoniensis, p. 149, I could not make sure of its identity without having the female, as the description is evidently based upon that sex alone.

Through the kindness of Dr. E. P. Felt, of the New York State Museum, Dr. L. O. Howard, and the authorities of the United States National Museum, I now have before me eight males and seven females. Three of these specimens were determined by Dr. W. H. Ashmead.

Westwood's specimen was from Georgia, and as the description is inaccessible to many, it is here reproduced:

" *Metapelma spectabilis.*—Met. capite thoraceque viridibus, cupreonitentibus ; antennis nigris ; abdomine nigro, chalybæo purpureoque nitente ; pedibus quatuor anticis ferrugineis viridi subnitentibus ; tarsis intermediis fuscis ad basin albidis ; pedibus duobus posticis fuscis femoribus basi rufis ; tibiis basi albis ; oviductu nigro ; alis pone medium nubecula vix infumatis.

" Long. corp. lin. 2¼ ; oviductus, lin. 1 ; exp. alar. lin. 3¾."

Among the specimens before me the females vary in length from 3¼–4¾ mm., and the males from 2½–4½ mm. The length of the ovipositor is considerably less than that indicated by Westwood, being from .7–1.3 mm. The antennæ are inserted farther from each other than from the eye margin. The scape is greenish, with a metallic lustre. In both sexes the posterior femora vary from dusky to yellowish brown, there being no reddish at the base in these specimens. The white spot at the base of the posterior tibiæ is confined to the upper basal third, and is bounded by a straight diagonal line in most of the specimens ; in two males from Florida and one male from Tuscon, Ariz., it surrounds the base; in a male from Santa Cruz Mts., Cal., and a female from Panamint Mts., Cal., the spot is shorter and broader, and bounded by a curved instead of a straight line. The specimens from Florida and the South-west have the posterior tibiæ more strongly dilated than the Eastern forms (Fig. 20) ; the Virginian forms have the white spot long and narrow as in the Northern specimens, while the tibiæ are intermediate in width.

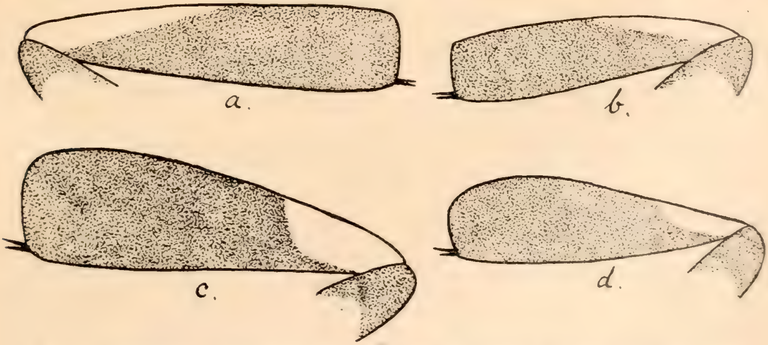

FIG. 20.—Hind tibiæ of Metapelma spectabilis, Westw., showing variations in form and markings. (*a*) Female, Ilion, N. Y.; (*b*) male, Ithaca, N. Y.; (*c*) female, Panamint Mts., Cal.; (*d*) male, Santa Cruz Mts., Cal.

The specimens examined by me are as follows :

1 ♂, 1 ♀, Albany, N. Y., May 7 and 11, 1903, reared from an ash stick infested by *Obrium rubrum ;* 2 ♀'s, Ilion, N. Y., 10th June, 1902,

"reared from hickory limb bearing large black knots, and from which were reared *Dicerca lurida*, *Chrysobothris femoratus*, *Magdalis olyra*, *Lepturges querci* and *Chramesus icoriæ*, the Magdalis being perhaps the more abundant." E. P. Felt *in lit.;* 1 ♀, Washington, D. C. (W. H. Ashmead); 1 ♀, Norfolk, Va.; 2 ♂'s Len Haven Road, Va., bred by Hopkins from a Rattan Vine; 2 ♂'s, Cocoanut Grove, Fla., May, 1887 (E. A. Swartz); 1 ♂, Santa Cruz Mts., Cal.; 1 ♀, Los Angeles, Cal.; 1 ♂, Tuscon, Ariz., reared Feb, 1897, from Mesquite twigs by H. G. Hubbard; 1 ♀, Panamint Mts.. Cal., April, 1891, and 1 ♂, 12th Aug., 1907, Ithaca, N. Y.

The other species of the genus Metapelma are distributed as follows *M. gloriosa*, West., Luzon, Philippines; *M. rufimana*, Westw., Sarawak, Borneo; *M. taprobanæ*, Westw., Ceylon; *M. obscurata*, Westw., Eastern India; *M. mirabilis*, Brues, Cape Colony.

A NEW NAME IN MEGACHILE.

Megachile geophila, n. n.—*Megachile terrestris*, Ckll., Ann. Mag. Nat. Hist., March, 1908, p. 260 (not of Schrottky, 1903). Florissant, Colorado. T. D. A. COCKERELL.

BOOK NOTICE.

INSECT STORIES: by Vernon L. Kellogg, New York; Henry Holt and Company. 298 pages, 12 mo. Illustrated. (Price $1.50 net, by mail $1.62.)

One hardly expected that the writer of such serious works as "Darwinism To-day," "American Insects," etc., should present us with a collection of charming stories about insects and their strange doings. Professor Kellogg has, however, accomplished a somewhat difficult task, and produced a book of fascinating interest that appeals not only to youthful readers, but to their elders as well. Whoever begins to read it, if he has any love of nature in his composition, will hardly put the book down till he has finished. Furthermore, the stories are all true; there is no attributing human reasoning to the creatures described, as is so often done in tales about animals. The actual doings of the insects are described, their haunts and habits, their enemies and their prey. It would be difficult to find a more delightful Christmas gift for young people, or a book more suitable for reading to children in a nature-study class.

Mailed December 8th, 1908.

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CORRIGENDA.

Page 124, line 15, for *Macophora* read *Nacophora*.
Page 192, line 6, for *Lycœa* read *Lycæna*.
Page 227, line 4 from bottom, for *negascia* read *nefascia*.
Page 303, line 1, for *Eleas* read *Fleas*.
Page 360, line 19, for "fused metasternum and first abdominal sternite" read "metasternum."

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